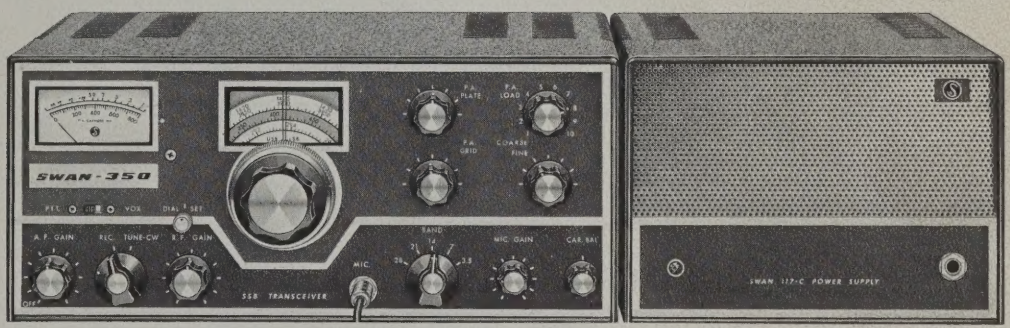
Price $1.50

OPERATION AND MAINTENANCE



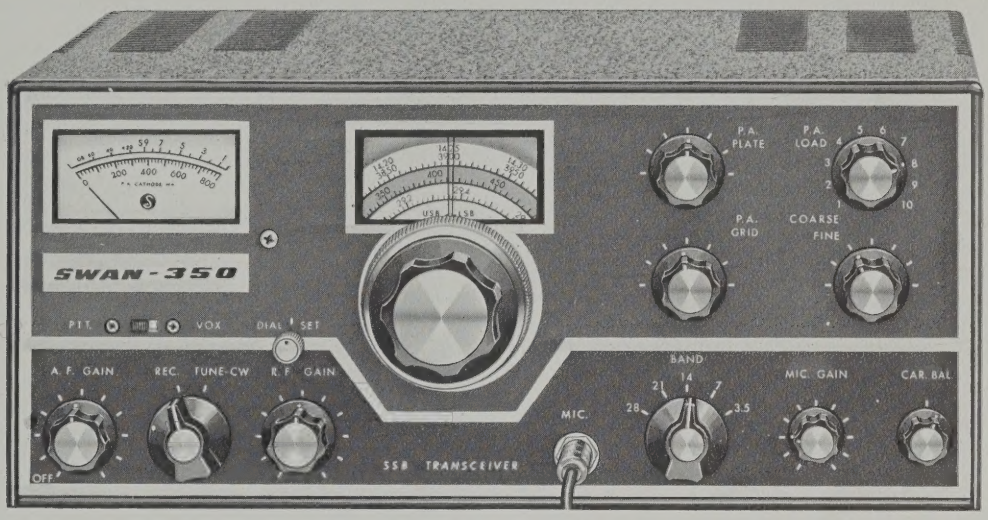
SWAN MODEL 350

SWAN
ELECTRONICS CORP.
Oceanside, California

Digitized by the Internet Archive
in 2025 with funding from
Amateur Radio Digital Communications, Grant 151

https://archive.org/details/operationmainten00unse_3

OPERATION and MAINTENANCE
MODEL 350 SERIES
Single Sideband Transceiver



INTRODUCTION

The Swan Model 350 Single Sideband Transceiver together with its accessories and optional equipment, is designed to be used in either CW or SSB modes on all portions of the 80-, 40-, 20-, 15-, and 10-meter amateur radio bands. MARS frequencies may also be covered by using the Model 405 oscillator accessory.

The Model 350 generates a single sideband signal by means of a crystal lattice filter, and the transceive operation automatically tunes the transmitter to the received frequency. Provisions are included in the transceiver for operation on the most used sideband for each frequency range, and provision for other sideband coverage is available as an optional kit.

Basic circuitry of the single conversion design has been proven in several thousand of the popular Swan transceivers. Mechanical, electrical, and thermal stability is exceptionally high. All oscillators are temperature compensated and voltage regulated. Push-to-talk operation is standard, with provision for plugging in the Model VX-1 accessory Vox unit for automatic voice control.

The basic transceiver provides coverage of all portions of the 80 through 10-meter amateur bands. In addition to this, the amplifier circuits will tune to most MARS frequencies near the 80-, 40-, and 20-meter bands. By using the Model 405 oscillator accessory, MARS operation is thus possible.

With a suitable power supply, operation may be fixed, portable, or mobile. Power input on all bands exceeds 400 watts, PEP, on single sideband, 320 watts on CW, and 125 watts on AM. The basic transceiver includes automatic gain control (AGC), automatic level control, (ALC), and grid-block CW keying.

Part I of the instruction manual covers the basic transceiver. Part II covers the recommended power supplies, Model 117-XC for ac operation, and Model 14-117 for 12-volt dc operation. Part III provides information on various accessories.

SWAN
ELECTRONICS CORP.
Oceanside, California

CONTENTS:

A. CIRCUIT THEORY
B. INSTALLATION
C. OPERATION
D. ALIGNMENT AND TROUBLE SHOOTING
E. PARTS LIST
F. SCHEMATIC
G. POWER SUPPLIES
H. ACCESSORIES

SPECIFICATIONS:

FREQUENCY RANGES

80 Meters	3.5 to 4.0 mc LSB
40 Meters	7.0 to 7.5 mc LSB
20 Meters	13.85 to 14.350 mc USB
15 Meters	21.0 to 21.5 mc USB
10 Meters	28.0 to 29.7 mc USB

(Note: Opposite sideband selection available with accessory Kit.)

POWER INPUT

Single Sideband, Suppressed Carrier:
400 watts, PEP, minimum on all bands.
CW:
320 watts, dc input on all bands.
AM (Single Sideband with Carrier):
125 watts dc input on all bands.

DISTORTION

Distortion products down approx. 30 db.

UNWANTED SIDEBAND SUPPRESSION

Unwanted sideband down more than 40 db.

CARRIER SUPPRESSION

Carrier suppression greater than 50 db.

RECEIVER SENSITIVITY

Less than 0.5 microvolt at 50 ohms impedance for signal-plus-noise to noise ratio of 10 db.

AUDIO OUTPUT AND RESPONSE

Audio output, 4 watts to 3.2 ohm load. Response essentially flat from 300 to 3000 cps in both receive and transmit.

TRANSMITTER OUTPUT

Wide-range Pi-network output matches antennas essentially resistive from 15 to 500 ohms impedance, with coarse and fine load adjustment.

METERING

Power amplifier cathode current 0-800 ma on transmit, S-Meter 0-70 db over S9 on receive.

FRONT PANEL CONTROLS

Rec-Tune-CW, AF Gain, Mic. Gain, Bandswitch, Carrier Balance, PA Plate Tune, PA Grid Tune, PA Load Coarse, PA Load Fine, VOX-PTT Switch, Dial Set, RF Gain.

REAR PANEL CONTROLS AND CONNECTORS

Bias potentiometer, CW key jack, Jones plug power connector, Vox connector, Antenna jack, S-Meter zero, Auxiliary relay switchings.

VACUUM TUBE COMPLEMENT

V1	6EW6 VFO Amplifier
V2	12BE6 Transmitter Mixer
V3	6GK6 Driver
V4	6HF5 Power Amplifier
V5	6HF5 Power Amplifier
V6	12BZ6 Receiver RF Amplifier
V7	12BE6 Receiver Mixer
V8	6EW6 First IF Amplifier
V9	12BA6 Second IF Amplifier
V10	12AX7 Product Detector/Receive Audio
V11	6BN8 AGC Amplifier/Rectifier
V12	6GK6 Audio Amplifier
V13	7360 Balanced Modulator
V14	12BA6 Carrier Oscillator
V15	12AX7 Mic. Amplifier/Transmit Audio
V16	OA2 Voltage Regulator

DIODE AND TRANSISTOR COMPLEMENT

Q1	2N706 Oscillator
Q2	2N706 Emitter Follower
D401	TS-2 ALC diode
D402	TS-2 ALC diode
D601	TS-2 S-Meter delay diode
D1601	1N2974A Zener voltage regulator
D1602	TS-2 Relay Silencing Diode

POWER REQUIREMENTS

Filaments	12.6 volts, 5.5 amps, ac or dc
Relay	12 volts dc, 250 ma.
Bias	-110 volts dc, 100 ma.
Medium voltage	275 volts dc, 150 ma.
High voltage	800 volts dc, 500 ma. Peak Trans.

DIMENSIONS AND WEIGHT

Height	5-1/2 in.	Depth	11 in.
Width	13 in.	Weight	17-1/4 lb.

A. CIRCUIT THEORY

GENERAL DISCUSSION

The Swan 350 transceiver provides single sideband, suppressed carrier transceive operation, and generates the single sideband signal by means of a crystal lattice filter. To permit a logical discussion of this mode of operation, certain definitions are necessary. In a normal AM signal, (double sideband with carrier), a radio frequency signal is modulated with an audio frequency signal. This is considered by many to be merely a case of varying the amplitude of the carrier at an audio rate. In fact, however, there are actually sideband frequencies generated, which are the results of mixing the RF and the AF signals. These sidebands are the sum of, and the difference between the two heterodyned signals. In the detection of this conventional AM signal, the two sidebands are mixed with the carrier to recover and reproduce the audio intelligence. This is an inefficient means of transmission, because only 25 percent of the transmitted power is used to transmit intelligence. There are other attendant drawbacks, also. The bandwidth of AM voice transmission is approximately 6 kc, while the actual demodulated audio is only approximately 3 kc. The result is inefficient use of the frequency band, and over half of the alloted band is unusable due to heterodynes, interference, and congestion.

In the single sideband, suppressed carrier mode of transmission, only one of the sideband signals is transmitted. The other sideband and the carrier are suppressed to negligible level. In addition to increasing the transmission efficiency by a factor of four, single sideband effectively doubles the number of stations or channels which can be used in a given band of frequencies.

It should be remembered that in the single sideband, suppressed carrier mode of transmitting, the unwanted sideband and carrier are only suppressed, not entirely eliminated. Thus, with a transmitted signal from a transmitter with 40 db sideband suppression, the other or unwanted sideband will be present, and will be transmitted, but its level will be 40 db below the wanted sideband. When this signal is received at a level of 20 db over S9, the unwanted sideband will be present at a level of approximately S5. The same is true of carrier suppression. With carrier suppression of 50 db, and a signal level of 20 db over S9, carrier will be present at a level of approximately S3 to S4.

In the Model 350 transceiver, the single sideband suppressed carrier signal is generated by the crystal lattice filter method. For details, refer to the schematic diagram, and to Figures 1, 2, and 3.

SIGNAL GENERATION

When the push-to-talk switch on the microphone is pressed, the transmitter portion of the transceiver is activated, and it generates a single sideband, suppressed carrier signal in the following manner. Carrier is generated by V14 Carrier Oscillator, which is a Pierce oscillator with the crystal operating in parallel resonance. This stage operates in both the transmit and receive modes. When transmitting, the RF output of the oscillator is injected into the control grid of the Balanced Modulator, V13. This balanced modulator is a beam deflection tube, and operates similar to a cathode ray tube in that the electron beam from the cathode is deflected to one output plate or the other by the charge appearing on the deflection plates. The carrier signal fed to the control grid of the balanced modulator appears on both plates of the output. The two plates are connected to Transformer Z1301 in push-pull, so the carrier signal cancels itself out in Z1301. The deflection plate DC voltages are adjusted by means of the carrier balance control so that the RF being fed to the output plates will cancel out, and the output from Z1301 will be zero. Audio signals from the Microphone Amplifier, V15, are applied as a modulating voltage to one deflection plate, and the two sidebands resulting from the sum and difference frequencies of the audio and carrier signals appear in the output of transformer Z1301. Carrier suppression is approximately 50 db.

The double sideband, suppressed carrier signal is then coupled from the secondary winding of Z1301 to the crystal filter, which suppresses the lower sideband, and permits only the upper sideband to be fed to the First IF Amplifier, V8. The carrier frequency is generated at approximately 5172.8 kc. With the optional other sideband crystal, the carrier crystal frequency will be 5176.3 kc, and this positions the double sideband signal on the other side of the filter response curve, attenuating the upper sideband by at least 40 db. In the single conversion mixing process, these sidebands become inverted on 80 and 40 meters. Thus the Swan-350 normally operates on lower sideband on 80 and 40, while on 20, 15, and 10 meters normal operation is on upper sideband.

Q1, the VFO 2N706 Oscillator, operates in the common base configuration as a Colpitts oscillator. Q2, the Emitter Follower is used for isolation and impedance matching purposes. The extremely good regulation achieved through using the Zener diode regulator D1601 across the bias supply voltage, also contributes to the stability. Bandswitching is accomplished by changing the tank circuit coil. The VFO in the Model 350 exhibits extremely good stability after the initial warm-up period. Drift from a cold start will be approximately 1 kc for the first hour on 80-, 40-, and 20-meter bands, and 2 kc on 10 and 15 meters. After the initial warm-up period, drift will be negligible.

The single sideband, suppressed carrier signal from the First IF Amplifier is fed to the Transmitter

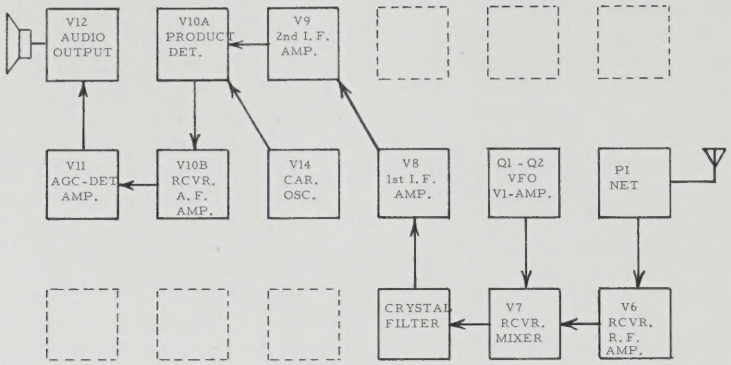


FIGURE 1 BLOCK DIAGRAM, RECEIVE MODE

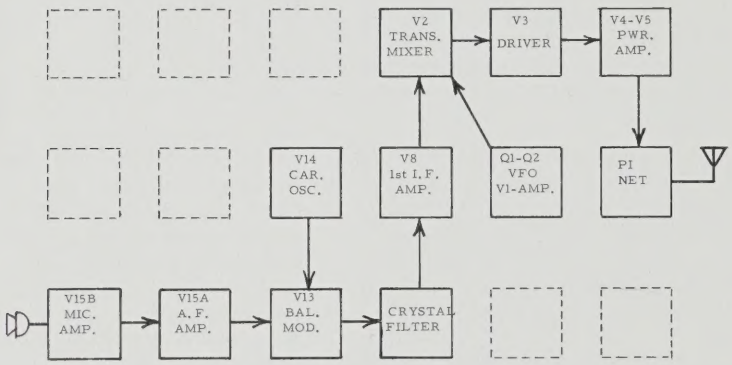


FIGURE 2 BLOCK DIAGRAM, TRANSMIT MODE

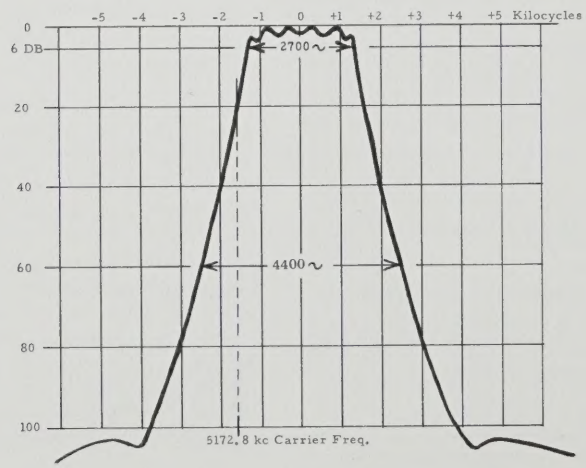


FIGURE 3 CRYSTAL FILTER, TYPICAL CHARACTERISTIC

I MODEL 350 TRANSCEIVER

A. Circuit Theory (Cont)

SIGNAL GENERATION (cont)

Mixer, V2, where it is heterodyned with the VFO signal. The resultant signal at the desired transmit frequency is amplified by the Driver, V3, and the Power Amplifiers, V4 and V5. The signal from the VFO Amplifier is initiated in the transistorized VFO-Emitter Follower circuit Q1, Q2. The signal from the VFO is routed to the VFO Amplifier, and on 40 and 80 meters, is subtractively mixed with the single sideband signal from the IF Amplifier to result in LSB operation. On 20, 15, and 10 meters, the frequencies are additively mixed, resulting in output on the upper sideband.

When in TRANSMIT, the gain of the First IF Amplifier is controlled through the Automatic Level Control network D401-D402, etc., to control the gain of the stage in response to the average input power to the Power Amplifiers. This ALC system will compensate for any extremely strong input signals, but does not completely eliminate the necessity of proper adjustment of the Mic. Gain Control. This feature will help prevent the transmitter from flat-topping and spurious emissions, but considerable distortion may occur if the Mic. Gain Control is not properly adjusted. Refer to Operating Instructions.

TUNE AND CW OPERATION

Normally, the frequency of the carrier oscillator is approximately 300 cps outside the 6 db passband of the crystal lattice filter. In TUNE position, to enable the transmitter to be tuned to the maximum power output condition, the frequency of the carrier oscillator is moved approximately 500 cps to place it well within the passband of the crystal lattice filter. At the same time, one deflection plate of the balanced modulator is grounded, unbalancing the modulator and allowing full carrier input for tuning purposes. A similar procedure is followed for CW to allow full carrier output during CW operation. During CW operation, the cathode of V15A is disconnected from ground. This allows CW operation with no accidental audio modulation from the microphone.

RECEIVE

In RECEIVE position, or at any time when the transmitter is not in TRANSMIT, all circuits used in transmitting are disabled through the relay controlled circuits, K1, K2. The relays are energized for transmitting and de-energized for receiving. Relay K2, when de-energized, allows signals from the transmitting tank circuit and antenna to be fed to the Receiver RF Amplifier, V6, where they are amplified and then fed to the control grid of the Receiver Mixer, V7. The local oscillator signal from the VFO Amplifier is now used to heterodyne the received signal to the IF frequency. All IF amplification is accomplished at this frequency, nominally 5174.5 kc, through V8 and V9 IF amplifiers. In the Product Detector V10A, the IF signal is heterodyned with the carrier frequency generated by Carrier Oscillator, V14. The resultant audio signal is then amplified by V10B, which then couples to V11, the AGC amplifier, and V12, the output audio stage.

FREQUENCY CALIBRATION

Frequency calibration of the Model 350 is in 5 kc increments on 80-, 40-, 20-, and 15-meters, and in 20 kc increments on 10M. 80- and 20-meters are calibrated directly on the upper dial scale. 40- and 15-meters are calibrated from zero to 500 on the green tinted center scale, and 10-meters is calibrated directly on the lower dial scale.

The two red indicator lines on the dial window represent the passband of the transceiver, and the actual carrier frequency depends on which sideband is in use. For upper sideband, carrier frequency is read with the left hand indicator line. For lower sideband, use the right hand line.

Dial accuracy and tracking are very good on the 350, but caution must always be observed when operating near band edges. Some means for measuring frequency is recommended. The optional calibrator kit will serve this purpose, and installs quite easily inside the transceiver.

TRANSMIT AND RECEIVE SWITCHING

Transmit and receive switching is performed by relays K1 and K2. In TRANSMIT position, only those tubes that operate in the transmit mode are operative, all others being biased to cutoff through the relay contacts. In the RECEIVE position, with the relays de-energized, the tubes that are used only in transmit are cut off in the same manner. Relay K2 when de-energized, feeds signals from the output pi-network to the receiver, and is used also to control external switching circuits. In transmit position the meter indicates the combined cathode current of the two power amplifiers. In receive position, it indicates the voltage across R902 in the cathode of the Second IF Amplifier, V9, which is inversely proportional to the AGC voltage used to control the gain of the tube. Thus, the meter indicates the relative strength of received signals.

POWER RATING

The Swan 350 is capable of 400 watts, PEP input under steady state two-tone test conditions, when operated with any of the recommended power supplies. The peak envelope power, when voice modulated, is considerably greater, typically 500 watts, or more.

Recommended power supplies produce a no-load plate voltage of approximately 925 volts. Under TUNE conditions, or CW operation, this voltage will drop to approximately 720 volts. Under steady state two-tone modulation, the voltage will drop to approximately 750 volts. If the power amplifier idling current is 50 ma, and the two-tone current,

A. Circuit Theory (Cont)

just before flat-topping, is 375 ma, the peak two-tone current will be 560 ma. Under these conditions the PEP input will be 750 volts times 560 ma, = 420 watts. Under voice modulation, because average power is considerably less, the power amplifier plate and screen voltages will be maintained higher, even during voice peaks, by the power supply filter capacitors. Peak plate current will therefore also be higher than with two-tone test conditions. Under typical operating conditions, peak plate current before flat-topping will be 625 ma at 800 volts, to result in an input of 500 watts, PEP. Readings of cathode current will not reflect this 500 watt power input, however, because of the damping in the cathode current meter. Cathode current readings under normal voice input should not exceed approximately 150 to 175 ma.

POWER AMPLIFIER PLATE DISSIPATION

There is often a misunderstanding about the plate dissipation of tubes operated as AB1 amplifiers under voice modulation. In the Swan 350, while in the transmit position, and with no modulation, the plate voltage will be 890 volts, the plate current 50 ma, and the power input will be 45 watts.

Authorities agree that the average voice power is 10 to 20 db below peak voice power. Normally some peak clipping in the power amplifier can be tolerated, and a peak-to-average ratio of only 6 db may sometimes occur. Under such conditions, the average power input will be 125 watts, and average plate current will be 156 ma. With power amplifier efficiency of 65 percent, plate dissipation will be 44 watts, or 22 watts per tube. The 6HF5 is rated at 28 watts, continuous duty cycle, in normal TV service. Thus it can be seen that under normal operating conditions, the power amplifier tubes in the Swan 350 are not being driven very hard. Note, however, that proper modulation level must be maintained by correct setting of Mic. Gain, and that the length of time in TUNE position must be limited to not more than 30 sec. at a time.

B. INSTALLATION

GENERAL

The Swan 350 transceiver has been designed to provide the utmost in ease of operation, stability, versatility, and enjoyment. Maximum enjoyment from your Swan will depend to a great extent on the installation. For fixed station or portable use, operation with the Model 117-XC power supply provides a compact arrangement with maximum ease of operation. All switching is performed in the transceiver. For mobile installations, the Model 14-117 supply provides similar switching arrangements, and speaker output may be fed through the car broadcast receiver speaker.

POWER SUPPLY

The Swan Models 117-XC or 230-XC Power Supplies provide all necessary voltages required by the transceiver for AC operation. The supplies come equipped with a pre-wired plug and cable, all ready for plugging into the transceiver. The Model 14-117 supply for mobile operation includes all necessary cables, connector plug, fuses, and installation hardware. The Jones plug for connection to the transceiver is furnished with the unit.

Power requirements for the Swan 350 are listed in the following table. Pin connections to the Jones type power connector are listed as an aid in connecting other brands or home-brew supplies.

EXTERNAL SPEAKER CONNECTIONS

Audio output from the transceiver is provided at pin 12 of the Jones plug. The other speaker lead goes to the common chassis ground at pin 6. Output impedance is between 3 and 4 ohms. For mobile installations, the car broadcast speaker may be used, in which case a DPDT selector switch should be installed to select either the broadcast receiver or transceiver output. (See Figure 9).

JONES PLUG CONNECTIONS

	Pin	Nominal	Minimum	Maximum
High Voltage	8	800 VDC 500 MA	600 VDC Low Pwr.	1200 VDC Hi. Power
Medium Voltage	10	275 VDC 150 MA	225 VDC	325 VDC
Bias Voltage	3	-110 VDC 100 MA	-100 VDC	-130 VDC
Filament Voltage	4	12.6 V* 5.5 amp	11.5 V	14.5 V
Relay Voltage	5	12 VDC 250 MA	10 VDC	14.5 VDC
*AC or DC				

MICROPHONE

The microphone input is designed for high impedance microphones only. The choice of microphone is important for good speech quality, and should be given serious consideration. The crystal lattice filter in the transceiver provides all the restriction necessary on audio response, and further restriction in the microphone is not required. It is more important to have a microphone with a smooth, flat response throughout the speech range. The microphone plug must be a standard 1/4 in. diameter three-contact type. The tip connection is for push-to-talk relay control, the ring connector is the microphone terminal, and the sleeve is the common chassis ground. The microphone manufacturer's

instructions should be followed in connecting the microphone cable to the plug. With many microphones, the push-to-talk button must be pressed to make the microphone operative. For VOX operation, this feature may be disabled, if desired, by opening the microphone case and permanently connecting the contacts which control the microphone.

ANTENNA

Any of the common antenna systems designed for use on the high frequency amateur bands may be used with the Swan transceiver, provided the input impedance of the transmission line is not outside the capability of the pi-output matching network. The transmission line should be of the coaxial cable type. An antenna system which shows a standing wave ratio of less than 4:1 when using 50 or 75 ohm coaxial transmission line, or a system that results in a transmission line input impedance that is essentially resistive, and between 15 and 500 ohms will take power from the transceiver with little difficulty. If open-wire or balanced type transmission line is used with the antenna, a suitable antenna tuner is recommended between the transreceiver and the feedline. Methods of constructing and operating such tuners are described in detail in the ARRL Antenna Handbook, and similar publications. For operation on the 75- and 40- meter bands, a simple dipole antenna, cut to resonate in the most used portion of the band, will perform satisfactorily. For operation on the 10, 15, and 20 meter bands, the efficiency of the station will be greatly increased if a good directional rotary antenna is used. Remember that even the most powerful transmitter is useless without a proper and efficient antenna system.

MOBILE ANTENNA

Mobile antenna installations are critical, since any mobile antenna for use on the high frequency bands represents a number of compromises. Many amateurs lose the efficiency of their antenna through improper tuning. Points to remember about the mobile antenna used with the Swan 350 are:

1. The "Q" of the antenna loading coil should be as high as possible. There are several commercial models available which use high "Q" coils, including the Swan Model 45 and Model 55 5 band "Swantennas".

2. The loading coil must be capable of handling the power of the Model 350 without over heating. In TUNE position, the power output of the transceiver may exceed 250 watts. Wide spaced, heavy wire loading coils are essential.

3. The SWR bridge is a useful instrument, but unfortunately it is quite often misunderstood, and over rated in importance. Basically, the SWR bridge will indicate how closely the antenna load impedance matches the transmission line. With long transmission lines, such as will be used in many fixed station installations, it is desirable to keep the impedance match fairly close in order to limit power loss. This is particularly true at the higher frequencies. The longer the line, and the higher the frequency, the more important SWR becomes. However, in mobile installations the transmission line seldom exceeds 20 feet in length, and an SWR of even 4 to 1 adds very little to power loss. The only time SWR will indicate a low figure is when the antenna presents a load close to 50 ohms, but many mobile antennas will have a base impedance as low as 15 or 20 ohms at their resonant frequency. In such a case, SWR will indicate 3 or 4 to 1, and yet the system will be radiating efficiently.

4. The really important factor in your mobile antenna is that it should be carefully tuned to resonance at the desired frequency. The fallacy in using an SWR bridge lies in the fact that it is sometimes possible to reduce the SWR reading by detuning the antenna. Field strength may actually be reduced in an effort to bring SWR down. Since field strength is the primary goal, we recommend a Field Strength Meter for antenna tuning.

5. For antenna adjustments, the Swan-350 may be loaded lightly to about 100 ma. cathode current instead of the usual 500 ma. This will limit tube dissipation during adjustments, and will also help reduce interference on the frequency. In any case, do not leave the transmitter on for very long at one time. Turn it on just long enough to tune and load, and get a field strength reading.

   Start out with the antenna whip at about the center of its adjustment range. Set the VFO to the desired operating frequency and then adjust P. A. TUNE for dip, and P. A. LOAD for 100 ma. Then observe the field strength reading. The Field Strength Meter may be set on top of the dash, on the hood, or at an elevated location some distance from the car.

   Change the whip length a half inch, or so, at a time, retune the P.A. for 100 ma. loading each time, and check field strength. Continue this procedure until the point of maximum field strength is found. This adjustment will be most critical on 75 meters, somewhat less critical on 40, etc., until on 10 meters the adjustment will be quite broad. After tuning the antenna to resonance, load the P. A. to full power.

ON-OFF SWITCH (On AF Gain Knob)	Turns power supply on and off.
REC-TUNE-CW	
Receive	All voltages are applied to transceiver.
Transmit (Push-to-Talk)	12 volt dc circuit through relay K1 and K2 is completed, and tubes used only in receive are biased to cutoff.
Tune-CW	All circuits for transmit are energized, as above, but one deflection plate of the balanced modulator is grounded, capacitor C1401 in the carrier oscillator is removed from ground.
MIC. GAIN	Controls potentiometer R1503 in the grid of V15A and controls amount of audio to the balanced modulator.
CAR. BALANCE	Controls potentiometer R1305 in the balanced modulator deflection plate circuit, and permits nulling out the carrier.
RF GAIN	Controls variable resistor R609, common in the cathodes of RF Amplifier, V8 and V9 IF Amplifiers.
AF GAIN	Controls potentiometer R1201 in grid circuit of V12 AF Output, and controls audio volume.
MAIN TUNING	Controls C1706 in frequency determining tank circuit of VFO.
PA GRID	Controls C1A and C1B in plate tanks of transmitter mixer and driver.
PA TUNE	Controls C417 on pi-network to tune final power amplifier plate to resonance.
PA LOAD, Fine	Controls C420 in pi-network to match impedance of output load. Tunes input to Receiver RF Amplifier.
PA LOAD, Coarse	Switches in progressively more capacitance in parallel with PA Load, Fine.
MAIN BANDSWITCH	Switches, plate coils, and associated capacitors of VFO, VFO Amplifier, V1, Transmitter Mixer, V2, and Driver, V3. Also switches tank coil of pi-coupling system and associated capacitors in PA output tank.

C. OPERATION

Before connecting any cables to the Swan 350 perform the following steps:

1. Rotate the PA BIAS control on the rear chassis apron, fully counter clockwise.
2. Rotate the REC-TUNE-CW located on the lower left of the front panel counter clockwise to REC.
3. Rotate the AF GAIN Control counter clockwise to operate the power switch to OFF.

POWER SUPPLY AND ANTENNA CONNECTIONS

1. Connect a 50 to 75 ohm antenna feedline to the coaxial connector on the rear chassis panel.
2. Connect the power supply cable to the Jones connector on the rear chassis apron.
3. Connect the power supply to the proper voltage source.

The Swan Model 350 may be operated from 117 volts, ac, 50 - 60 cycle power with the Model 117-XC power supply, or from 230 volts, 50 - 60 cycles with the Model 230-XC. The Model 350 may be operated from a 12 volt dc source with the Swan Model 14-117 power supply.

WARNING

DANGEROUS HIGH VOLTAGE IS PRESENT ON THE PLATE OF THE POWER AMPLIFIER WHENEVER THE POWER SUPPLY IS ENERGIZED. NEVER TURN POWER ON WHEN THE POWER AMPLIFIER COVER IS REMOVED. HIGH VOLTAGE IS ALSO PRESENT AT PIN EIGHT OF THE POWER PLUG.

RECEIVE OPERATION

1. Rotate the AF GAIN Control clockwise to about the 3 o'clock position. The power switch will operate applying filament, relay, bias, medium, and 800 volt high voltage to the transceiver.
2. Wait approximately one minute to allow the tube filaments to reach operating temperature. During this period, perform the following steps:

   (a) Rotate the BANDSWITCH to desired band.
   (b) Rotate MIC. GAIN fully counter-clockwise.
   (c) Rotate CAR. BAL. control to the mid-scale position, with white dot on knob aligned with the long index mark on the panel.
   (d) Preset PA PLATE control to mid-position.
   (e) Preset PA GRID control to mid-position.
   (f) Preset PA LOAD FINE to mid-position.
   (g) Preset PA LOAD COARSE to position 1.
   (h) Set tuning dial to desired operating frequency.
   (i) Set RF GAIN control to approximately 3 o'clock position.

3. Carefully adjust the PA GRID and the PA PLATE controls for maximum receiver noise. Note: The PA GRID control resonates the transmitter driver stages and the receiver RF amplifier plate circuit. The PA PLATE and PA LOAD controls adjust the input and output capacitors in the transmitter power amplifier final plate circuit, as well as the receiver RF amplifier grid circuit. Proper adjustment of these controls in the receiver position will result in approximately resonant conditions in the transmitter stages.

RECEIVER TUNING — IMPORTANT, READ CAREFULLY.

Precise tuning of a single sideband signal is very important. Do not be satisfied to merely tune until the voice can be understood, but take the extra care of setting the dial to the exact spot where the voice sounds natural. Above all, avoid the habit of tuning so that the voice is pitched higher than normal. This is an unfortunate habit practiced by quite a number of operators. The following points help to explain the effects of mistuning:

1. If you tune so the received voice is higher than normal pitch, you will then transmit off frequency, and your voice will sound lower than normal pitch to the other station. He will probably retune his dial to make you sound right. If you keep this up, you'll gradually waltz one another across the band. If both of you are mistuning to an unnatural higher pitch, you'll waltz across the band twice as fast. (And someone will no doubt be accused of frequency drift).
2. Mistuning results in serious harmonic distortion on the voice, and should be quite noticeable to the average ear. Some will claim that if they don't know how the other person's voice actually sounds, they can't tune him in properly, but this is not true. With a little practice, it will be fairly easy to tell. Some voices are relatively rich in harmonics, and are easier to tune in than a person with a "flat" voice. Also, a transmitter which is being operated properly with low distortion will be easier to tune in than one which is being over-driven and is generating excessive distortion. There is no mistaking when you have a station tuned right on the nose. It will sound just like "AM", so to speak. Mainly, avoid the habit of tuning so everyone sounds higher than normal pitch, or like Donald Duck. This is incorrect, unnecessary, and sounds terrible.
3. A vernier control for receive frequency, sometimes referred to as "incremental tuning", is not available on the Swan-350. Such a device is not necessary if proper tuning habits are exercised.
4. Your Swan-350 will automatically transmit on exactly the same frequency as the one to which you are listening. There is no adjustment for making them the same, since by using the same oscillator for both send and receive, it happens automatically. If separation of receive and transmit frequency control is desired, the model 406B or 410 VFO unit may be used. The model 22 dual VFO adaptor must be installed in the 350 in order to accomodate the 406B or 410.

TRANSMITTER TUNING

CAUTION

The Model 350 covers several frequency ranges outside the amateur bands. Care must be exercised not to transmit on these frequencies.

Tuning of the transmitter is not complicated, provided the few simple steps are followed in the correct order. Do not attempt initial tuneup without first performing the procedures for Receive operation described above. The following procedures assume that the unit has been checked out in Receive position, and a high impedance push-to-talk microphone is inserted in the MIC. JACK.

1. Press Push-to-Talk to place unit in TRANSMIT, read the cathode current on the meter.
2. Quickly rotate the CAR. BAL. control on the front panel until the meter reads minimum cathode current.
3. Next, adjust the PA BIAS control on the rear of the chassis until the meter reads 50 ma.

4. If this is the first time the transceiver is being tuned on this band, set the PA LOAD switch to position 1. After experience in tuning up, the control may be set to whatever position has been found to be optimum on each respective band. Now, in rapid succession:
   (a) Turn the CAR. BAL. control clockwise until a slight increase in meter reading is obtained.
   (b) Rotate the PA GRID control for maximum meter reading.
   (c) Rotate the PA PLATE control for minimum meter reading.
   (d) Adjust car. bal. for a reading of 150 ma.

   IMPORTANT—Tuning the PA PLATE for minimum, or "dip", is known as "resonating" the power amplifier plate circuit, and is very important to preserving tube life. If the transceiver is held in Transmit or TUNE position for more than a few seconds while out of resonance and with some grid drive, the 6HF5 tubes may be severely damaged. For this reason we repeat: **CAUTION**—Do not hold the transceiver in Transmit or TUNE position for any length of time without "dipping" the PA PLATE control. The PA GRID must first be "peaked" as in (b), above, and this requires some carrier supplied as described in (a), so it can be seen that these steps must be performed quickly. If the PA LOAD control is too far clockwise, it may not be possible to find a "dip" with the PA PLATE control. For this reason, be sure to observe the first sentence in this section, Step 4.

5. Rotate the REC. TUNE switch to TUNE position. Quickly check the PA PLATE control for "dip" or minimum reading. If the meter dips to less than 500 ma., increase loading by rotating the PA LOAD controls clockwise. After each increase in PA LOAD, resonate the PA PLATE again; that is, adjust it for dip. Continue increasing PA LOAD until the PA PLATE dips to 450-500 ma. Then switch back to RECEIVE.

   CAUTION: Do not hold the transceiver in TUNE position for more than 30 seconds at a time, even though PA PLATE is resonated. With full grid drive to the 6HF5 PA tubes, which you have in TUNE position, they are dissipating considerably more power than they do during normal voice transmission, so a short tuning period must be observed.

6. Under some conditions, it may not be possible to load up to 500 ma. This may occur with lower than normal line voltage or tubes not quite up to par, particularly on 10 meters. The current increase when tuning the plate circuit off resonance will provide a clue as to how far the power amplifier can be loaded. If the meter swings up to 600 or 700 ma. on either side of resonance, it will be easy to load up to 500 or even more. But, if the tubes draw just 500 ma. off resonance, you can only load to 400 or 450 ma. This is not necessarily a sign that you have a problem. Peak input power with voice modulation will still be 400 watts when you load to 400 ma. in TUNE position. A new pair of PA tubes may allow you to load higher, or possibly a new driver tube will help. Primarily, the level to which you can load will serve as an indication of when tubes are deteriorating. If you can load to 500 ma. when the set is new, and after a few months of operating you cannot get above 400 ma., or so, it is probably time to replace the 6HF5 tubes, and possibly the 6GK6 driver. The other tubes should also be checked at that time.

7. AVERAGE PA LOAD SWITCH POSITIONS. The following positions are for a 50 ohm non-inductive load, and indicate approximately where the PA LOAD switch will end if the antenna and coaxial cable are well matched.

BAND	PA LOAD SWITCH
80	POS. 7
40	8
20	9
15	9
10	10

   A large deviation from these positions indicates a possible matching problem, although operation may still be quite satisfactory. PA LOAD switch positions below 5 will generally be needed only with very low impedance loads, such as a 75 meter mobile antenna with center loading coil.

7. VOICE TRANSMISSION. After tuning up as outlined above, press the Push-to-Talk button on the mike and carefully set the CAR. BAL. control for minimum meter reading. While speaking into the mike, slowly rotate the MIC. GAIN control until occasional peak reading of 175 to 200 ma. are obtained. With most microphones, the MIC. GAIN control will be set between 9 and 12 o'clock, but it may vary considerably. The ALC circuit will help limit cathode current to about 200 ma., but turning the MIC. GAIN up too high will still produce flat-topping and spurious signals, so it is important to hold it down. The meter is quite heavily damped, and its reading with average voice modulation may not look very impressive, but the voice peaks are going well over the 400 watt power rating of your Swan transceiver, and signal reports will verify this fact.

8. TRANSMITTER TUNING WITH SWR BRIDGE OR FIELD STRENGTH METER. If either of these instruments is available, they are highly recommended as a better method

of tuning the PA Amplifier, since they provide a direct indication of relative output. With the SWR Bridge in Forward position, or with the Field Strength Meter set to pick up a portion of the radiated power, simply adjust the PA TUNE and PA LOAD controls for maximum output. This must be done quickly, limited to about 30 seconds, to limit tube dissipation as previously mentioned. This method will result in maximum possible output and efficiency, as well as maximum linearity. You will probably find that cathode current readings end up somewhat less than 500 ma. on 10 meters because grid drive is the least on this band. On 80 meters where grid drive is the greatest, maximum output will be reached at more than 500 ma. These are a normal condition.

NOTE—The cathode current level to which the PA is loaded will have no bearing on tube life. When transmitting with normal voice modulation, average power input will be the same regardless of how high or low the PA was loaded while tuning. Peak output, linearity, and lowest distortion will go along with maximum loading. In other words, you will not extend tube life by loading to a lesser degree. The secret to long tube life is simply to keep TUNE-up periods short and not too frequent.

AM OPERATION (Single Sideband With Carrier)

1. Tune transmitter to full output on single sideband as described above.
2. Rotate MIC GAIN control to minimum full CCW.
3. With Push-to-Talk pressed, rotate CAR. BAL. control until cathode current is approximately 150 ma.
4. While talking in a normal tone of voice into the microphone, increase MIC GAIN setting until the meter kicks upward slightly. This setting will result in excellent AM transmission.

CW OPERATION

1. Tune transmitter to full output as for SSB operation. Then, with transceiver in TUNE-CW position, adjust car. bal. for 400 ma. on all bands except 15 meters. On 15 meters a maximum of 350 ma. is recommended in order to suppress unwanted spurious radiation which may become excessive when the drive is run above 400 ma. At 350 ma., CW power will still be a respectable 280 watts.
2. Insert CW Key in the Key Jack provided on the back of the 350. Use a standard 1/4 inch diameter 2 circuit phone plug.
3. Add a .47 or .5 mf 200 volt capacitor across the Key. This capacitor may be added internally to the 350 if desired.
4. Switch to TUNE-CW position to transmit. Back to RECEIVE for receiving.
5. Information on a sidetone modification circuit for the 350 will be furnished upon written request.

D. ALIGNMENT AND TROUBLESHOOTING

GENERAL

The following procedures are given in the order performed during the factory alignment for the transceiver. For home servicing, only partial alignment may be necessary. Read all procedures carefully before commencing either partial or complete alignment. See Figures 4 and 5 for component placement.

Equipment Required

1. Calibrated audio frequency signal generator, range 200 to 5000 cps.
2. 500 watt dummy load with output meter
3. Vacuum tube voltmeter
4. Walsco 2543 coil adjustment tool
5. Field strength meter
6. Calibrated RF Signal Generator

Pre-Alignment Conditions

1. Neutralizing capacitors C413 set to mid-point and C315 set to approximately 3/4 turn from full compression.
2. Peak IF transformers for maximum background noise with AF and RF gain full clockwise (either bottom or top core adjustment).
3. Loosely couple field strength meter to C318 (off pin 9 of V4) with alligator clip on ceramic capacitor body.
4. Transmit bias potentiometer full counter-clockwise (maximum bias).

VFO AMPLIFIER PLATE CIRCUIT ALIGNMENT

With VTVM from pin 1 of V7, Receiver Mixer, to ground, on -15 volt scale, adjust VFO Amplifier Plate coils for peak VTVM heading as follows:

Band	VFO Frequency (kc)	Dial Frequency (kc)	Coil
80	8,975	3,800	L104
40	12,300	7,125	L103
15	16,050	21,225	L102
10	23,325	28,500	L101

TRANSMITTER MIXER AND DRIVER PLATE CIRCUIT ALIGNMENT

1. Remove screen voltage from V4 and V5 by disconnecting the wire from terminal strip immediately adjacent to V5 base. (A, Fig. 5).

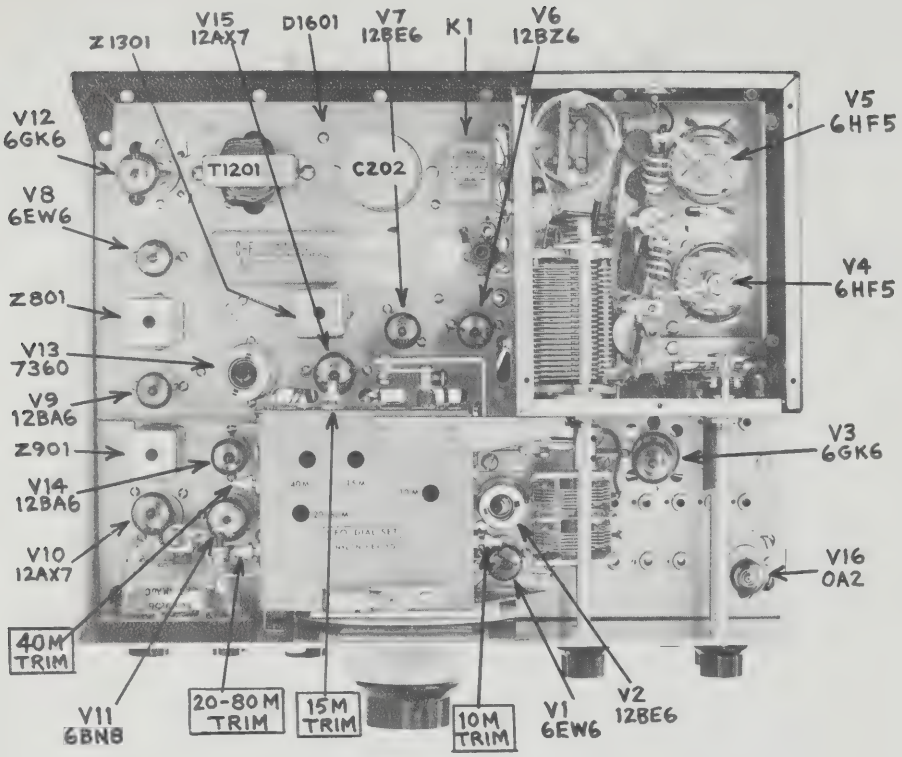


FIGURE 4
TOP VIEW,
MODEL 350
TRANSCEIVER

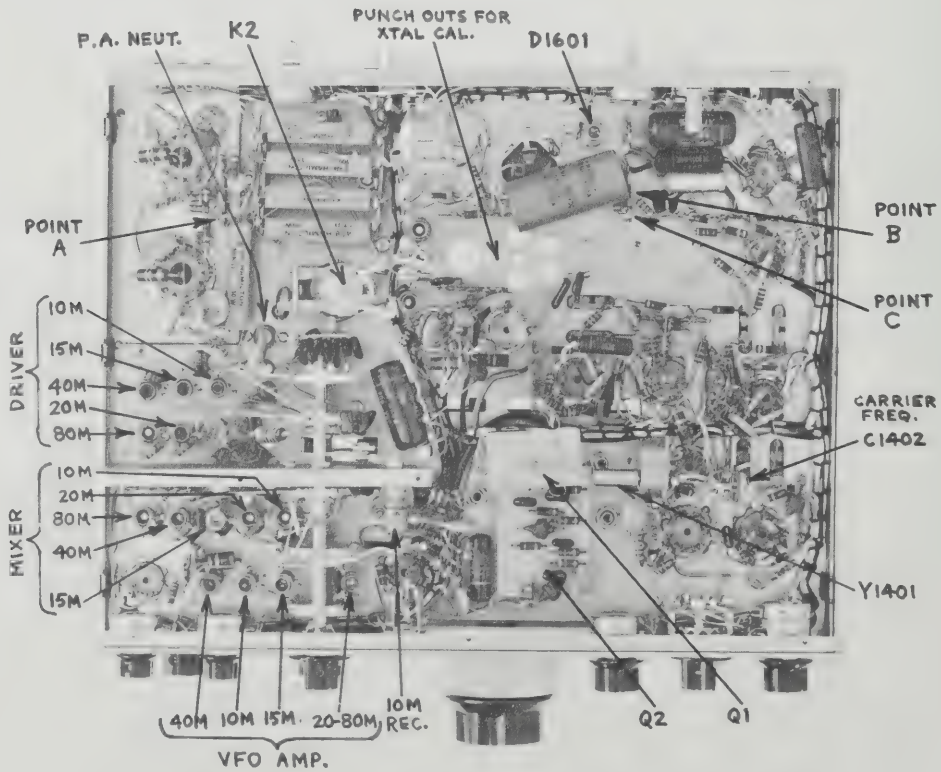


FIGURE 5
BOTTOM VIEW,
MODEL 350
TRANSCEIVER

2. Connect VTVM across R412, 4.7K resistor between pins 1 and 2 of terminal strip immediately behind bifilar coil in crystal filter range -15 volt scale. (Points B and C, Fig. 5).
3. Set PA grid tuning to 1 o'clock, REC-TUNE CW switch in REC. position.

Procedure:

Adjust bandswitch to band shown, and adjust coils for peak VTVM reading as follows:

Function Switch	Band	Dial Freq.(kc)	Adjust
Tune*	80	4,000	L205,Z1301 C1402,L305
Tune	40	7,300	L204,L304
Tune	20	14,350	L203,L303
Tune	15	21,300	L202,L302
Tune	10	29,200	L201,L301

*Note: If VTVM and field strength meter exceed full scale reading, switch to REC. position, actuate push-to-talk circuit, and insert carrier with carrier balance control to keep reading on scale. Field strength meter and VTVM must both peak at same time since it is possible to tune the coils to the VFO frequency on 10 meters. Care must be taken that the coils be tuned properly.

Following the above procedures, replace screen wire to pin 1 of terminal strip adjacent to V5.

ALIGNMENT OF 5175 KC FILTER TRAP

With RF and AF gain at midscale, feed 5175 kc signal to antenna connector and adjust L602 until the heterodyne signal is nulled to minimum.

ALIGNMENT OF 13 MC FILTER TRAP

Tune VFO to 14,325 kc, insert RF signal to antenna at 13,000 kc and tune RF generator for heterodyne signal in speaker. Adjust L603 and L604 for minimum heterodyne signal.

ADJUSTMENT OF CARRIER FREQUENCY

A. With dummy load and output meter attached, tune transceiver for maximum output.

B. Null out carrier with PTT pressed and set resting plate current to 50 ma with bias pot.

C. Connect AF generator to MIC JACK, adjust MIC. GAIN full CCW.

Procedure:

1. With AF generator at 1500 cps, increase MIC. GAIN to produce a 100 ma. reading on the meter.
2. Adjust Z801 for maximum meter reading.
3. Adjust both top and bottom cores of Z1301 for maximum meter reading.
4. Adjust MIC. GAIN for meter reading of 300 ma.
5. Set AF generator to 300 cps. Adjust C1402 for meter reading of 75 ma.

P.A. NEUTRALIZATION

With P.A. coarse load in position 1, set freq. to 14.150, PA Plate control at 9 o'clock, insert carrier and peak P.A. Grid control, adjusting Car. Bal. control for 200 MA. Turn PA control slowly through resonance. Cathode current should dip smoothly and rise to 200 MA on the low capacity side of resonance. If, instead, there is a peak above 200 MA either side of the dip, stop rotation of the PA plate control at the peak and adjust C 413 to reduce Ip to 200 MA. Repeat above check and readjust as necessary to obtain the desired smooth dip. For 10 meters, use above procedure but adjust #C 315.

ADJUSTMENT OF L601

With transceiver tuned to 28.8 mc, and RF and AF gain at maximum, adjust L601 for maximum background noise.

S-METER ADJUSTMENT

With antenna disconnected and with RF gain fully clockwise, set R605, located on rear panel, for full scale meter reading. Make sure no local signals are being received.

VFO ALIGNMENT

A locking type trimmer condenser is provided for each VFO range, of which there are four. The same range is used on both 20 and 80 meters. Dial tracking has been factory set by pruning the coil, and will not ordinarily require further adjustment.

When dial calibration changes beyond the adjusting range of the front panel dial set control, calibration may be restored by carefully adjusting the trimmer for that range. It may be necessary to loosen the locknut. Be sure to tighten it again.

The following chart lists the actual oscillating frequency of the VFO at band edges:

Dial Frequency	Oscillator Frequency
3500 (13.85)	8673 KC
3800 (14.15)	8973
4000 (14.35)	9173
7000	12,173
7200	12,373
7300	12,473
21,000	15,827
21,250	16,077
21,450	16,277
28,000	22,827
28,500	23,327
29,000	23,827
29,700	24,527

TROUBLESHOOTING GUIDE	
DEFECT	POSSIBLE CAUSE
PA IDLING CURRENT UNSTABLE	1. Defective 6HF5 2. Defective Bias Potentiometer 3. Defective Bias Supply
INABILITY TO LOAD TO 400-500 MA. (SEE PAGE 10)	1. PA Grid Improperly Tuned 2. Bandswitch Improperly Set 3. Antenna Not Resonant at Frequency 4. Defective Transmission Line 5. Defective Mobile Antenna Coil 6. V2, V3, V4, V5 Defective 7. R407 or R408 Defective
INSUFFICIENT CARRIER SUPPRESSION	1. Carrier Balance Control Improperly Adjusted 2. Defective 7360 Balanced Modulator 3. Carrier Oscillator Frequency Incorrect
INSUFFICIENT SIDEBAND SUPPRESSION	1. Excessive MIC. Gain 2. Incorrect PA Load Adjustment 3. Carrier Oscillator Frequency Incorrect
MICROPHONICS IN RECEIVER	1. Z901 Improperly Tuned 2. V14, V10, V8, V7, or V6 Defective
LOW RECEIVER SENSITIVITY	1. PA Grid, Plate, or Load Improperly Set 2. Bandswitch Improperly Set 3. K2 Back Contacts Defective 4. V6, V7, V8, V9, V10, V11, V12 Defective

VOLTAGE CHART

TUBE TYPE		PIN NO. 1	2	3	4	5	6	7	8	9	10	11	12
V1 6EW6	R	0	.75	6.3	0	130	130	0					
	T	0	.75	6.3	0	125	125	0					
V2 12BE6	R	-90	0	12.6	0	245	240	-90					
	T	-2.0	0	12.6	0	245	100	0					
V3 6GK6	R	0	-30	0	6.3	0	0	255	255	0			
	T	0	-6.0	0	6.3	0	0	250	250	0			
V4 6HF5	R	6.3	—	—	0	-75	0	—	0	-75	0	—	0
	T	6.3	—	—	.12	-75	215	—	215	-75	.12	—	0
V5 6HF5	R	12.6	—	—	0	-75	0	—	0	-75	0	—	6.3
	T	12.6	—	—	.12	-75	215	—	215	-75	.12	—	6.3
V6 12BZ6	R	0	2.8	0	6.3	230	140	0					
	T	-85	0	0	6.3	230	0	0					
V7 12BE6	R	-3.0	0	12.6	0	235	75	0					
	T	-3.0	0	12.6	0	210	0	-75					
V8 6EW6	R	0	2.6	12.6	6.3	230	130	0					
	T	0.2	0.5	12.6	6.3	205	120	0					
V9 12BA6	R	0	0	12.6	0	230	105	3.2					
	T	-75	0	12.6	0	220	0	0					
V10 12AX7	R	155	-0.6	0	12.6	0	160	0	1.5	6.3			
	T	100	-75	0	12.6	0	155	0	1.5	6.3			
V11 6BN8	R	0.2	22	0.2	12.6	6.3	0	200	6	70			
	T	0	21	0	12.6	6.3	-70	100	3	40			
V12 6GK6	R	0	-6	—	12.6	6.3	—	240	230	0			
	T	0	-21	—	12.6	6.3	—	250	220	0			
V13 7360	R	0	245	-90	6.3	0	225	225	25	25			
	T	0	85	0	6.3	0	135	135	23	23			
V14 12BA6	R	-7	0	0	12.6	60	100	0					
	T	-7	0	0	12.6	60	100	0					
V15 12AX7	R	95	0	0.8			70	0.2	0	0			
	T	50	0	0.3	6.3	-6.3	50	0.2	0	0			
V16 0A2	R	150	—	—	—	150		0					
	T	150	—	—	—	150		0					

All Voltage Measurements Made With Simpson 260, 20 K Ohms Per Volt, Or Equivalent

E. PARTS LIST

CAPACITORS

C101	.002, 20% 1KV Disc
C102	.01, +80-20%, 500V Disc
C103	.002, 20% 1KV Disc
C104	.01, +80-20%, 500V Disc
C105	.01, +80-20%, 500 V Disc
C106	50, 5% 500 V Mica
C202	40-30-10-20 Mfd. 450-450-450-25 WV Elect.
C203	.002, 20% 1KV Disc
C204	.001, 5% 500V Mica
C205	15, 5% 500V Mica
C206	24, 5% 500V Mica
C207	120, 5% 500V Mica
C208	27, 5% 500V Mica
C209	20, 5% 500V Mica
C210	12, 5% 500V Mica
C211	50, 5% 500V Mica
C213	3.3 pf 10% 500V Ceramic
C214	.1 mf 10% 200V Mylar
C301	.01 +80-20% 500V Disc
C302	.01 +80-20% 500V Disc
C303	100 5% 500V Mica
C305	100, 5% 500V Mica
C306	15, 5% 500V Mica
C307	50, 5% 500V Mica
C309	510, 5% 500V Mica
C310	540, 5% 500V Mica
C311	100, 5% 500V Mica
C312	680, 5% 500V Mica
C313	50, 5% 500V Mica
C314	91, 5% 500V Mica
C315	1.5-20 pf Mica Trimmer
C316	15, 20% 3KV Disc
C317	220, 5% 500V Mica
C318	.002, 20% 1KV Disc
C401	.002, 20% 1KV Disc
C402	.002, 20% 1KV Disc
C403	.01 +80-20% 500V Disc
C404	.01, +80-20% 500V Disc
C405	.01, +80-20% 500V Disc
C406	10 mf 150 WV Electrolytic
C407	.01, +80-20% 500V Disc
C408	.01, +80-20% 500V Disc
C409	.01, +80-20% 500V Disc
C410	.002, 1KV Disc
C411	.002, 20% 3 KV Disc
C412	.002, 20% 3 KV Disc
C413	20 pf P.A. Neut. Trimmer
C414	15, 20% 3 KV Disc
C415	270, 5% 2500V Mica
C416	270, 5% 2500V Mica
C417	320 pf P.A. Tune
C418	50 10% 6 KV Disc
C419	100 10% 6 KV Disc
C420	410 pf P.A. Fine Load
C421	Two 150, 5% 1 KV Mica
C422	Two 150 5% 1 KV Mica
C423	330, 10% 500V Mica
C424	330, 10% 500V Mica
C425	330, 10% 500V Mica
C426	330, 10% 500V Mica
C427	330, 10% 500V Mica
C428	330, 10% 500V Mica
C429	330, 10% 500V Mica
C430	.002, +80-20% 500V Disc
C431	.47 10% 100V Mylar
C432	.01 Disc S M
C601	.01 +80-20% 500V Disc
C602	.01, +80-20% 500V Disc
C603	.01, +80-20% 500V Disc
C604	10, 5% 500V Mica
C605	5, 10% NPO
C606	100, 5% Mica
C701	30, 10% 1 KV Disc
C702	30, 10% 1 KV Disc
C703	.01 +80-20% 500V Disc
C704	220 5% 500V Mica
C705	430 5% 500V Mica
C709	.01, +80-20% 500V Disc
C802	.01 +80-20% 500V Disc
C803	.01, +80-20% 500V Disc
C804	10, 10% 1 KV Disc
C805	.002 20% 1 KV Disc
C901	.01, +80-20% 500V Disc
C902	.01, +80-20% 500V Disc
C903	.01, +80-20% 500V Disc
C904	.01, +80-20% 500V Disc
C1001	2 pf 10% Ceramic
C1002	.01, +80-20% 500V Disc
C1003	220, 20% 1 KV Disc
C1004	.002, 20% 1 KV Disc
C1005	.002, 20% 1 KV Disc
C1006	.002, 20% 1 KV Disc
C1007	500, 10%, 500V Disc
C1101	.001, 20% 1 KV Disc
C1102	.01, +80-20% 500V Disc
C1103	.47, 10% 100V Mylar
C1104	.001, 500V Disc
C1201	.01, +80-20% 500V Disc
C1202	220, 20% 1 KV Disc
C1203	.0047, 10% 1000V Mylar
C1204	.1 mf 10% 200V Mylar
C1301	.01 +80-20% 500V Disc
C1302	220 20% 1 KV Disc
C1303	.01, +80-20% 500V Disc
C1304	.002, 20% 1 KV Disc
C1305	.01, +80-20% 500V Disc
C1306	.01, +80-20% 500V Disc
C1401	50, 5% 500V Mica
C1402	6-30 pf Ceramic Trimmer
C1403	.01 +80-20% 500V Disc
C1501	.01, 400V Mylar
C1502	.01, +80-20% 500V Disc
C1503	.01, +80-20% 500V Disc
C1504	100, 20% 1 KV Disc
C1505	.01, +80-20% 500V Disc
C1601	80 mf, 150 WV Electrolytic
C1701	270, 2%, SM
C1702	470, 5% SM
C1703	430, 2%, SM
C1704	27, 5% SM
C1705	430, 2%, SM
C1706	5-12 Main Tuning
C1707	.01, 500V, Disc
C1708	5 pf Trimmer
C1709	22, N220 Disc
C1710	10, N150 Disc
C1711	5, N150 Disc
C1712	5 pf Trimmer
C1713	10, N150 Disc
C1714	25, NPO Disc
C1715	5 pf Trimmer
C1716	.01, 500V, Disc
C1717	2 pf Dial Set
C1718	22, N75, Disc
C1719	39, NPO Disc
C1720	5 pf Trimmer
C1721	5, N75 Disc
C1A-B	85 pf per section

RESISTORS

R101	82 ohms
R102	56 ohms
R103	47K - 1 watt
R104	12K - 2 watt
R201	27K
R202	18K - 2 watt
R203	4.7K - 1 watt
R204	6.8 K
R205	4.7K
R206	4.7K
R207	27K
R301	100K
R302	270K
R303	100 ohms
R304	10K
R305	8.2K
R306	10K
R401	2.2 Meg
R402	1K
R403	100 ohms
R404	100 ohms
R405	Selected
R406	470 - 5% - 1/2 W
R407	10K - 10 watt
R408	1 ohm - 5% - 1 watt
R409	1 ohm - 5% - 1 watt
R410	10K Bias Pot.
R411	10K - 1 watt
R412	4.7K
R413	4.7K
R601	1 Meg.
R602	56 ohms
R603	47K - 1 watt
R604	1K
R605	1K - S-Meter Pot.
R606	100 ohms
R607	470K
R609	10K RF GAIN
R701	27K
R702	22K - 1 watt
R703	1K

R801	470 ohms
R802	56 ohms
R803	47K
R804	1K
R805	100K
R901	47K
R902	100 ohms
R903	47K
R904	1K
R905	100K
R906	270K
R907	2.2M
R1001	1 Meg.
R1002	100K
R1003	270K
R1004	1 Meg.
R1005	2.7K
R1006	100K
R1101	470K
R1102	1K
R1103	47K
R1104	27K
R1105	270K
R1106	120, 1 watt
R1201	1 Meg. A.F. Gain Pot.
R1202	470K
R1203	270K
R1204	470K
R1301	47K
R1302	47K
R1303	150K
R1304	4.7K
R1305	5K CAR. BAL. Pot.
R1306	47K
R1307	47K
R1308	100K
R1309	100K
R1310	27K
R1401	1 Meg.
R1402	27K
R1403	27K
R1404	1K
R1501	150K
R1502	1K
R1503	1 Meg. MIC GAIN Pot.
R1504	270K
R1505	2.2 Meg.
R1506	27K
R1601	800 - 10 watts
R1602	900 - 10 watts
R1603	27K
R1604	27K
R1605	750 - 10 watts
R1606	6K - 10 watts
R1608	100K
R1701	1K, 5%
R1702	1K, 5%
R1703	1K, 5%
R1704	470, 5%
R1705	2.7K
R1706	2.7K
R1707	470, 5%

COILS

L101	23 mc - 2 uh
L102	16 mc - 4 uh
L103	12 mc - 7 uh
L104	9 mc - 4 uh
L201	28 mc - 2 uh
L202	21 mc - 2 uh
L203	14 mc - 3.2 uh
L204	7 mc - 3.6 uh
L205	4 mc - 11 uh
L206	RFC - 200 uh
L301	28 mc - 2 uh
L302	21 mc - 2 uh
L303	14 mc - 3.2 uh
L304	7 mc - 3.6 uh
L305	4 mc - 11 uh
L306	RFC - 200 uh
L401	14 mc - 0.8 uh
L402	4 mc - 6 uh
L403	RFC - 38 uh
L404	RFC - 200 uh
L405	RFC - 17 uh
L406	RFC - 55 uh
L601	28 mc - 1.2 uh
L602	5175 kc - 90 uh
L603	13 mc, 30 uh
L604	13 mc, 1.5 uh
L701	RFC - 200 uh
L1001	RFC - 200 uh
L1705	RFC - 200 uh
L1706	RFC - 200 uh

TRANSFORMERS

Z301	Parasitic Suppressor
Z401	Parasitic Suppressor
Z501	Parasitic Suppressor
Z801	5175 kc I.F. Trans.
Z901	5175 kc I.F. Trans.
Z1301	5175 kc BAL. MOD. Trans.
T1201	A.F. Output Trans.

SWITCHES

S-1	Power On-Off (with R/1201 AF GAIN)
S-2	REC-TUNE-CW
S-3	VOX PTT
S-4	A-B-C-D-E-F-G Bandswitch
S-5	PA Coarse Load

DIODES

D401	TS-2 ALC Diode
D402	TS-2 ALC Diode
D601	TS-2 S-Meter Diode
D1601	IN 2974A Zener
D1602	TS-2 Relay Quieting

RELAYS

K1	4PDT Relay, 12 VDC Coil
K2	PDT Relay, 12 VDC Coil

CRYSTALS

Y1401	5172.8 KC Car. Osc.

TUBES

V1	6EW6 VFO Amplifier
V2	12BE6 Trans. Mixer
V3	6GK6 P.A. Driver
V4	6HF5 Power Amplifier
V5	6HF5 Power Amplifier
V6	12BZ6 Rec. R.F. Amp.
V7	12BE6 Rec. Mixer
V8	6EW6 1st I.F. Amp.
V9	12BA6 2nd I.F. Amp.
V10	12AX7 Prod. Det/Rec. A.F.
V11	6BN8 AGC Amp./Rect.
V12	6GK6 A.F. Output Amp.
V13	7360 Bal. Mod.
V14	12BA6 Carrier Oscillator
V15	12AX7 Mic. Amplifier
V16	OA2 Voltage Regulator

TRANSISTORS

Q1	2N706
Q2	2N706

G. POWER SUPPLIES

GENERAL DESCRIPTION:

The Swan Universal Power Supply systems are designed to provide all necessary voltages required by Swan Transceiver models 240, 250, 300-C, 350, and 400. The model 117-X basic A.C. supply is designed for an input of 117 volts at 50 or 60 cycles. The model 230-X is identical except that it operates with either 117 or 230 volts. For fixed station use, the 117-X or 230-X is installed in a cabinet which matches the Swan transceivers. This cabinet also contains a speaker, phone jack, and indicator light. The complete combination is designated as model 117-XC or 230-XC. The A.C. line cord plugs into the back of the supply. In the 230-XC, provision for changing from 117 to 230 volts input is made by simply changing line cords. Wiring changes are taken care of in the line cord plug.

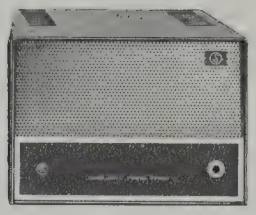


Fig. 6. MODEL 117-XC
AC POWER SUPPLY WITH SPEAKER

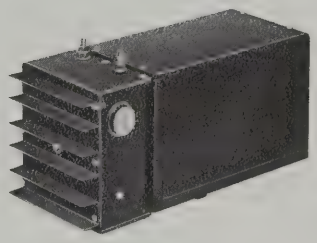


Fig. 7 MODEL 14-117
DC POWER SUPPLY

12 VOLT OPERATION:

A D.C. Module attaches to the back of the A.C. supply and converts it for 12 volts D.C. input. the model 14-X D.C. Module is for negative ground systems, the most common type. (For positive ground systems, the model 14-XP D.C. module is available.) The combined units are designated as model 14-117 or 14-230 depending on which A.C. supply is used. The positive ground models are designated as model 14P-117 or 14P-230.

With the versatility of this power supply design, a number of advantages become apparent. The D.C. supply may be operated from an A.C. line by detaching the D.C. module, making a simple wiring change, and plugging in an A.C. cord. (See instructions under "Mobile Installation.")

The matching A.C. supply, model 117-XC or 230-XC, may be converted easily to 12 volts input by attaching the 14-X D.C. module to the back. This provides for portable or emergency operation from a 12 volt battery. There may also be times when it will be desireable to operate temporarily in an automobile, such as during a vacation trip, field day, or emergencies. The 117-XC can be set on the floor or front seat, and with the 14-X attached it becomes a 12-volt power supply, complete with speaker.

SPECIFICATIONS:

Power Rating: 200 watts average, 500 watts peak.
Input:
Model 117-X: 117 volts nominal, 50-60 cycles
Model 230-X: 230 volts or 117 volts, 50-60 cycles.
Model 14-X: 13 volts D.C. nominal, 40 amps peak.
Output:
800 volts at 200 ma. average, 600 ma. peak.
275 volts at 150 ma. continuous.
110 volts negative bias, at 100 ma.
12 volts D.C. at 200 ma., relay supply.
12.6 volts A.C. at 5.5 amps. (with A.C. input only)

Battery Drain with Swan Transceiver
Rec: 3.5 amps. Trans: 16 amps average, 40 amps peak (not including filament drain of transceiver).

DESIGN:

Both the A.C. and D.C. sections are conservatively designed for long, reliable service with a minimum failure rate. At the same time, they are designed for easy access and servicing for those times when it is required. Any component can be readily checked out and replaced in a matter of moments. The D.C. module and A.C. supply can be detached quickly from one another and tested individually, thus isolating the source of trouble.

The A.C. suppy is quite conventional, using a silicon rectifier bridge for the medium voltage, and another for high voltage. The 117-X has a single primary winding for 117 volt input, while the 230-X has a pair of primary windings which connect in parallel for 117 volts, and in series for 230 volts. The switching is taken care of in the A.C. line cord plug.
The D.C. module uses two power transistors for switching in a flip-flop oscillator circuit. A large portion of the cost in this unit is in the transistors where no compromise has been made. They are rated at 60 amperes, with a 45 volt rating. A diode spike clipping circuit provides additional protection against one of the common sources of transistor failure.

MOBILE INSTALLATIONS READ CAREFULLY

The 12 volt electrical system in an automobile will sometimes generate high voltage transients. This can be caused by the starter motor, the alternator or generator, or loose wiring, and can represent a serious hazard to the transistors in your DC power supply. By selecting the best transistors available for the application, your Swan supply is capable of absorbing a good deal of abuse, but there is a limit to what even the best transistors can take and for this reason we strongly urge that you read the following notes completely, and follow them carefully.

(1) Clean and tighten the battery terminals and clamps.

(2) Tighten battery cables where they attach to the starter solenoid and engine block.

(3) Inspect battery cables for corrosion or wear. Replace them if they look questionable.

(4) Check battery condition frequently. If the cells do not hold a similar charge or water level, replace the battery.

(5) Check alternator, (or generator), and regulator connections for tightness. Also, primary ignition wiring, horn wiring, lights, etc.

(6) Check the charging voltage from the alternator. Often the regulator is misadjusted, and the voltage setting may be excessive. It should not read more than 14.5 volts at normal engine speeds.

POWER SUPPLY INSTALLATION:

(A) Connect the primary leads from the power supply directly to the battery terminals. Mount the ceramic fuse block with 50 amp. fuse in series with the positive lead. (With positive ground systems, the fuse goes in the negative lead). If possible, drill and tap a hole in the battery post itself for a contact stud. The more intimately the supply is connected to the battery, the less chance there is for voltage transients to reach it. Solder lugs are provided for the ends of the various leads.

(B) The filament line comes prewired to the Jones plug, and has an in-line 9 amp. fuse. Connect this line to the ignition switch accessory terminal, as recommended in the schematic, Fig. 8. In most cars the 12 volts at this terminal is switched off while twisting the ignition key to start the engine. Thus, the relay in the power supply will also be turned off, and the transistors will not be subjected to the sharp transients put out by the starter motor. NOTE: The car radio is normally connected to the accessory terminal for the same reason. It may be more convenient to locate the 12 volt line going to the car radio, and splice into it with the transceiver filament line. Look for the car radio fuse, and connect to this circuit on the "hot side".

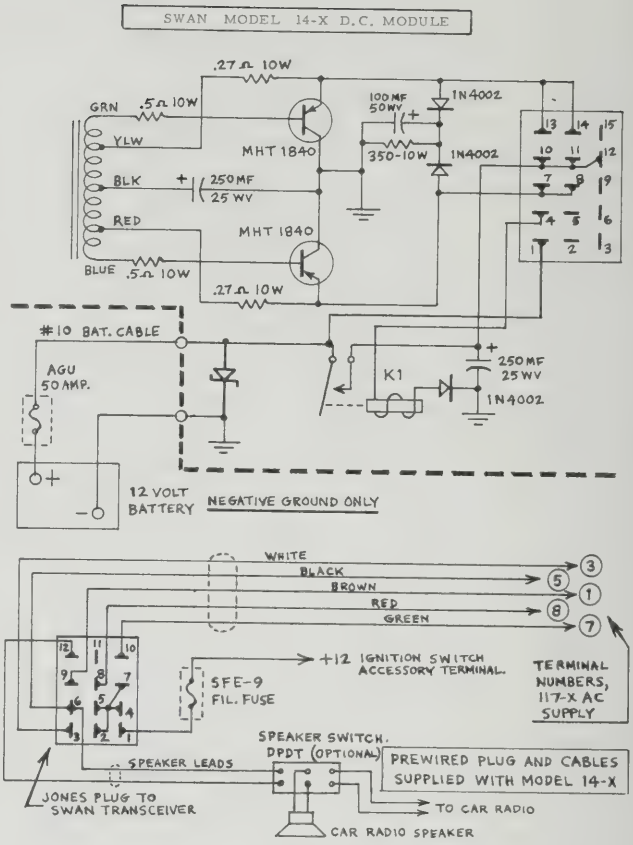


FIG. 8 MODEL 14-X D.C. MODULE

POWER SUPPLY PROTECTION—A Zener diode is installed in the Swan 14-X DC module for added protection. It is an 18 volt Zener which connects across the input terminals of the power supply. It conducts only when the input exceeds 18 volts, thus has no effect on normal operation. Transient voltage pulses which go beyond the 18 volt level will be absorbed by the diode, thus preventing them from reaching the transistors. This protection will be effective so long as the diode is operative. If transients reach a high enough level, or a long enough duration, the diode will eventually fail, and literally burn out. After this, the transistors are on their own, and will most likely fail for the same reason. (See Warranty Policy)

SPEAKER CONNECTIONS: Speaker leads coming from the Jones plug go to an under dash speaker, or to a speaker selector switch which may be installed as illustrated. Another arrangement which works well is to install a rear seat speaker for the car radio, and then connect the front speaker only to the transceiver.

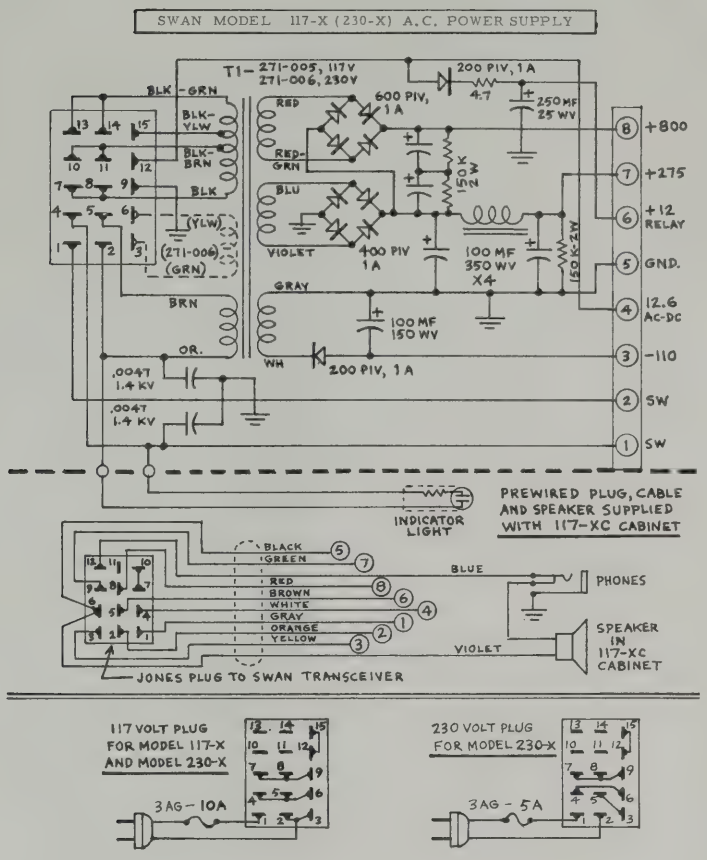


FIG. 9 MODEL 117-X (230-X) POWER SUPPLY

A.C. OPERATION: The 12 volt power supply may be operated from an A.C. line by two methods.

(A) Detach the D.C. Module, and plug in an A.C. line cord in place of it. Before applying power, disconnect the brown cable wire going to terminal (1) of the A.C. supply and connect a jumper from terminal (1) to (2). Temporarily tape the brown wire to keep it from shorting to ground, since it will be carrying 12 volts D.C. Now the power supply will operate when the A.C. line is plugged in, although the transceiver filaments will still be operating on the battery. This arrangement will be useful primarily for checking out the A.C. portion of the supply when trouble shooting.

(B) To operate the transceiver entirely on the A.C. line, it will be necessary to do the following: Disconnect the 5 wire cable going from the the transceiver to the A.C. portion of the supply. Replace it temporarily with a 10 wire cable and hook-up as illustrated in the schematic diagram Fig. 9. This is the same cable and speaker hook-up used in the matching cabinet, 117-XC. Using the D.C. supply in this manner will prove useful for portable or emergency operation from the car when A.C. power is available.

If frequent A.C. as well as D.C. operation with the mobile supply is contemplated, both the 5 wire and 10 wire cables may be connected simultaneously to the supply. Thus, when operating on D.C., the 5 wire cable is plugged into the transceiver, and on A.C. operation the 10 wire cable is used.

MATCHING CABINET:

Ordinarily the A.C. supply will be purchased complete in a matching cabinet as either model 117-XC or 230-XC. However, in some cases an owner may have purchased a 117-X or 230-X basic supply only, perhaps in a D.C. supply combination, and he may wish later on to mount it in a matching cabinet. For this purpose the cabinet with speaker and cables is available separately. The basic A.C. supply mounts inside with three screws, and the prewired cable connects as shown in the schematic. Connections to the phone jack and speaker have already been made. Two leads from the indicator light must be run through the grommet and soldered to the terminals provided at the bottom of the

supply. Refer to the schematic for clarification. The A.C. line cord is also provided with the matching cabinet kit. These line cords are available separately also, and come normally wired and stamped for 117 volts. 230 volt line cords are also available on special order, or the 117 volt line cord may easily be wired for 230 volts by referring to the schematic. Note that the 230 volt line cord will work only with the 230-X basic A.C. supply. The 117 volt line cord will work with either the 117-X or 230-X.

POWER SUPPLY

WARRANTY POLICY—The normal guarantee on your Swan power supply is for a period of 90 days from date of purchase, and covers all components, material and workmanship. In the case of transistor failure, however, the warranty on them will be void if inspection proves that high transient voltages from the automobile were responsible. We will do all in our power to be fair and just in this determination. The warranty card must be filled out and mailed to the factory within 10 days from date of purchase. Do not ship a unit to the factory for servicing without prior authorization. Check with your dealer first, as he may be in a position to handle the service work more quickly. This warranty is void if the equipment has been misused or damaged.

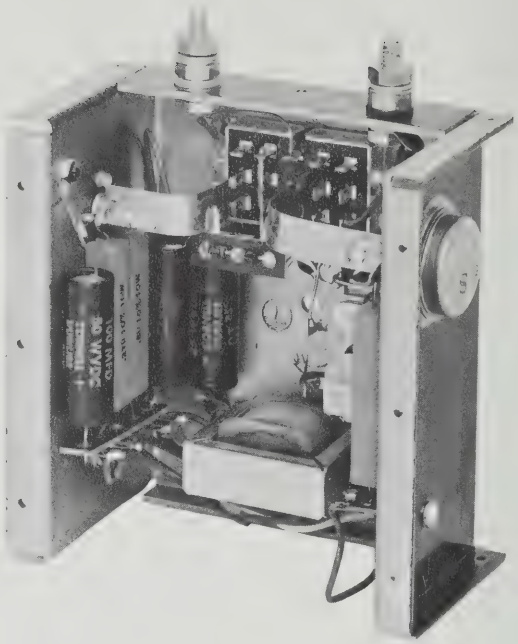


FIG. 10 MODEL 14-X, D.C. MODULE INTERNAL VIEW

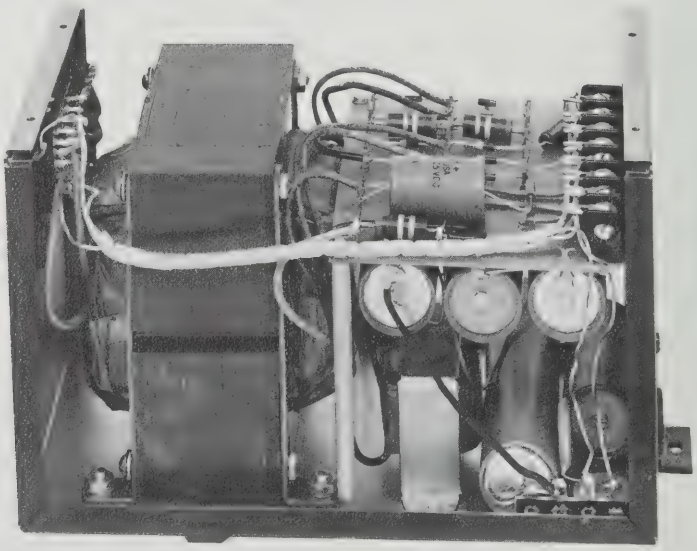


FIG. 11 MODEL 117-X BASIC AC POWER SUPPLY INTERNAL VIEW

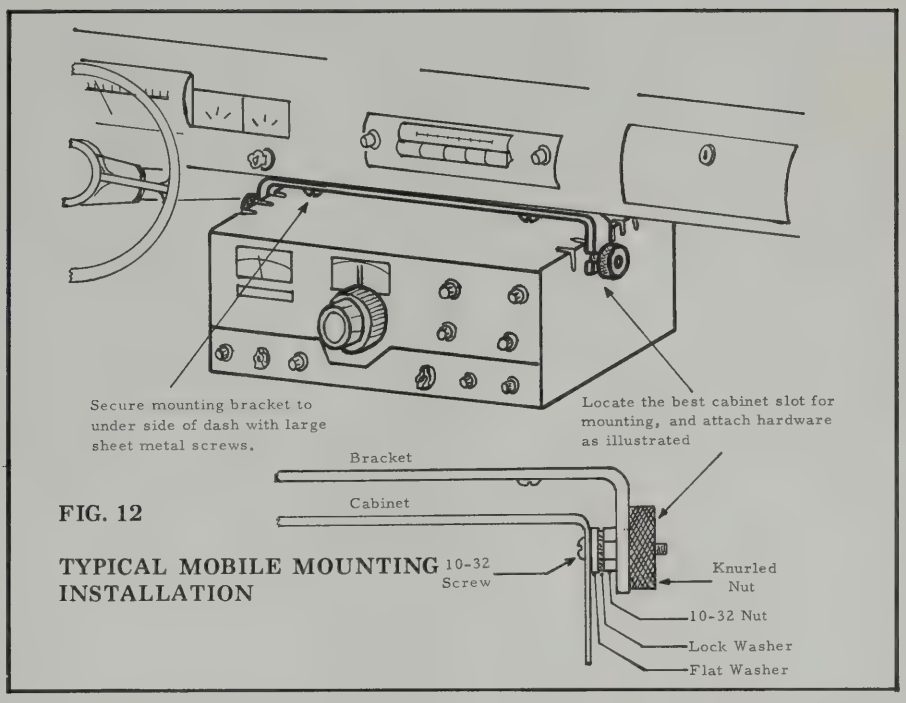


FIG. 12

TYPICAL MOBILE MOUNTING INSTALLATION

OUTBOARD VFO OPERATION WITH THE 350

Various outboard VFO operations are possible with the Swan 350.

SPLIT FREQUENCY OPERATION

For those desiring to work split frequency, transmit on one—receive on another, the model 22 DUAL VFO ADAPTOR is required. (See page 27) Complete instructions are also supplied with each model 22. Included with each model 22, is a prewired socket/harness assembly which is mounted in the accessory hole, punched in the rear of the 350 chassis. This assembly is referred to as the "accessory socket". (See page 28)

MARS OPERATION

For operation on Mars frequencies with the Model 405 oscillator, (See "Accessory" section) use of the model 22 is **not** essential. The accessory socket, only, can be used and is available on special order for $3.00. Included with the accessory socket are complete installation instructions. (See page 28) Follow steps one through four on this page. Delete "Orange, Blue and Green" in step five and all of step six. A jumper plug is also included with the accessory socket which, when plugged into the installed accessory socket will restore the 350 built-in VFO.

TRUNK MOUNTING

In the case of a remote installation, such as the 350 being mounted in the trunk of an automobile, and using a model 406 VFO with the Swan RC 2 remote control kit, the above use of the accessory socket is suggested with variations as outlined (See page 37)

For use of the outboard VFO gain control (Model 406, 410 or 420) while operating in conjunction with the model 22 adaptor with the 350 transceiver, the two RF pots can be wired in parallel. Whichever pot is not in use is turned completely counterclockwise.

It will be necessary to sacrifice the pilot lamps in the outboard VFO. Wiring changes are as follows:

1. Disconnect the 12 Volt wire from pin 5 of the auxilliary socket.
2. Connect a wire from pin 7 of K1 to pin 5 of the auxilliary socket. (This is common to the wiper of the RF gain pot in the 350).
3. Remove the wire from pin 5 of the VFO cable connector and tape it.
4. Move the lead from pin 4 of the VFO cable connector over to pin 5.

For operation of the outboard VFO RF gain control when **not** using the model 22 adaptor, but only the auxilliary socket, make wiring changes as follows:

NOTE—Pins 6 and 7 of the auxilliary socket are not used without the model 22—simplex operation of outboard VFO. With this configuration, there is no need to sacrifice VFO pilot lights.

1. Follow steps 1 thru 5 in modification instructions. Delete "Blue and Green" in step 5.
2. Remove grey wire from pin 4 of auxilliary socket and connect it to pin 6.
3. Connect a wire from pin 7 of K1 to pin 4 of auxilliary socket.
4. To restore inboard 350 VFO operation, use a jumper plug with a jumper between pins 3 and 6 and a jumper between pins 1 and 8.

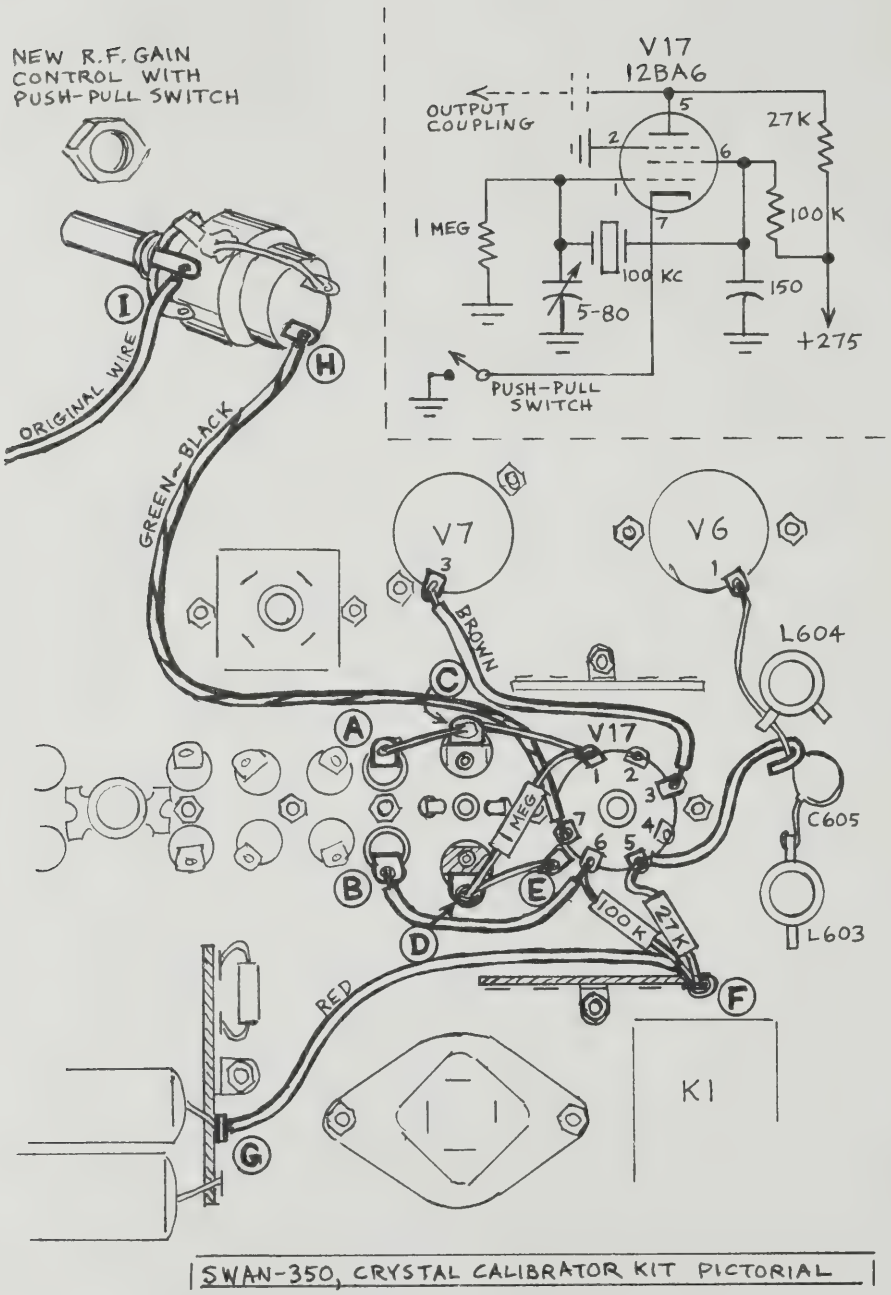

NEW R.F. GAIN CONTROL WITH PUSH-PULL SWITCH
V17 12BA6
OUTPUT COUPLING
27K
100K
1 MEG
100 KC
5-80
150
+275
PUSH-PULL SWITCH
ORIGINAL WIRE
GREEN-BLACK
V7
V6
BROWN
L604
V17
C605
L603
100K
27K
RED
K1
SWAN-350, CRYSTAL CALIBRATOR KIT PICTORIAL

FIG. 13

SWAN 350, CRYSTAL CALIBRATOR KIT. INSTALLATION INSTRUCTIONS

PARTS LIST:
1 - Pre-wired tube socket V17
2 - R. F. Gain Control with push-pull switch
3 - Mica trimmer
4 - Crystal Socket
5 - 12BA6 tube
6 - 100 KC crystal
7 - Red and Green-Black wires
8 - Two 4-40 screws, nuts, washers.

1. Locate the empty tube socket hole in the 350 chassis. Remove the 4-40 screw and nut from the mounting hole.

2. Mount the pre-wired socket in this hole, positioned as shown in the illustration. Be sure to include the ground lug on the chassis top side which was secured originally by the 4-40 screw. Use another 4-40 screw washer, and nut in the other mounting hole.

3. Mount the mica trimmer in the chassis holes as illustrated. **Make sure the ground end of the trimmer goes to "D" as shown.** This is the end of the trimmer with the most metal showing on the bottom, and goes to the top compression leaf. Bend the tabs over firmly to hold the trimmer in place.

4. Mount the crystal socket with a 4-40 screw and nut.

5. Connect the bare wire from Pin 1 of V17 to lug "C" of the trimmer and lug "A" of the crystal socket. Solder both connections.

6. Connect the bare wire from ground lug at "E" to trimmer lug "D". Do not solder.

7. Locate the 1 meg. resistor which comes connected to Pin 1 of the tube socket. Connect its other end to trimmer lug "D". Solder connections at "D".

8. Connect the sleeved wire from Pin 6 of the tube socket to lug "B" of the crystal socket. Solder at lug "B".

9. Connect the new red wire from terminal "F" to "G" (+275 volts). Solder "G" only.

10. Connect the 100K resistor from Pin 6 of the tube socket to terminal "F". Do not Solder.

11. Connect the 27K resistor from Pin 5 of the tube socket to terminal "F". Solder terminal "F".

12. Connect the brown wire from Pin 3 of the tube socket to Pin 3 of V7. Solder at V7. (12.6 volt heater lead).

13. Loop the sleeved wire from Pin 5 of the tube socket around one lead of C605. Do not actually connect the wire. A very small amount of capacity is all that is required at this point for coupling.

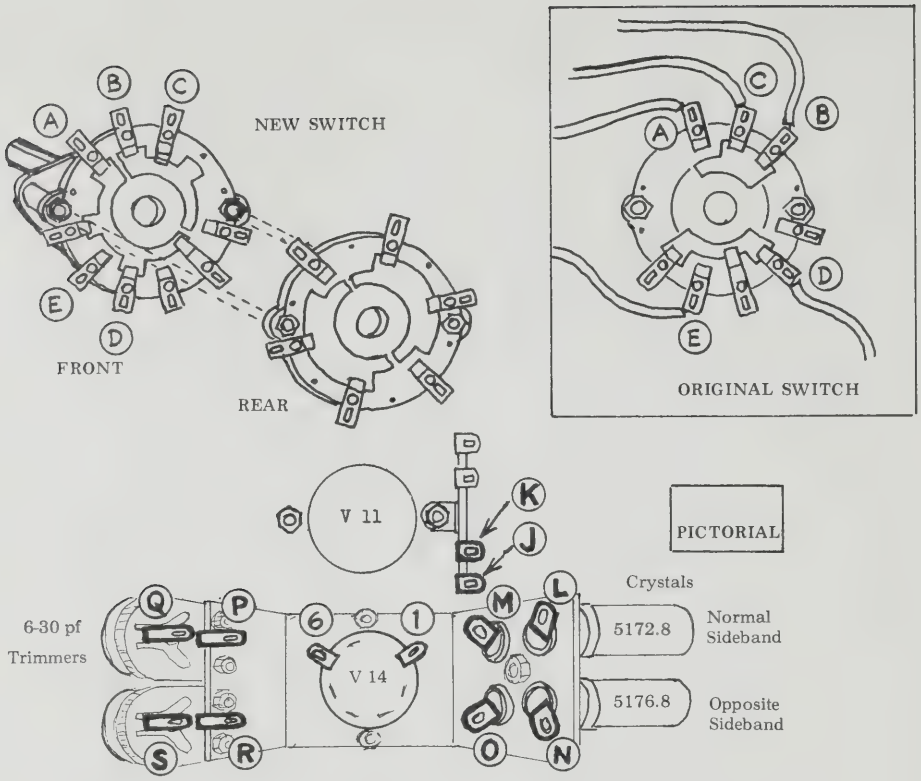
14. Locate the R.F. Gain Control on the front of the chassis, and disconnect the wire lead going to its center lug. Then remove the control from the set.

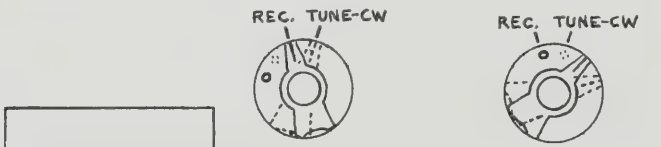
15. Replace the control with the new one which has a push-pull type switch on the back. Connect the wire lead to its center lug, and solder.

16. Dress the Green-Black wire from "H" on the switch neatly across the chassis and to Pin 7 of the tube socket. Solder.

17. Plug the 12BA6 and 100 KC crystal into their respective sockets. To turn on the calibrator, simply pull the R.F. Gain Knob out. Push in to turn it off.

18. The frequency of the 100 KC crystal can be adjusted exactly by tuning in WWV on a general coverage receiver, and heterodyning the 100 KC harmonic. This can be done by running a pick-up lead from the general coverage receiver antenna terminal over to the transceiver, and wrapping it around the 12BA6, 100KC oscillator tube. Then with the 350 in receive position, turn on the 100 KC calibrator by pulling out the R.F. Gain Knob. Then adjust the mica trimmer which has just been installed for zero beat with WWV at 5, 10, or 15 mc. This can be done most easily during the 2 minutes of each 5 minute period when WWV is not transmitting a steady tone.





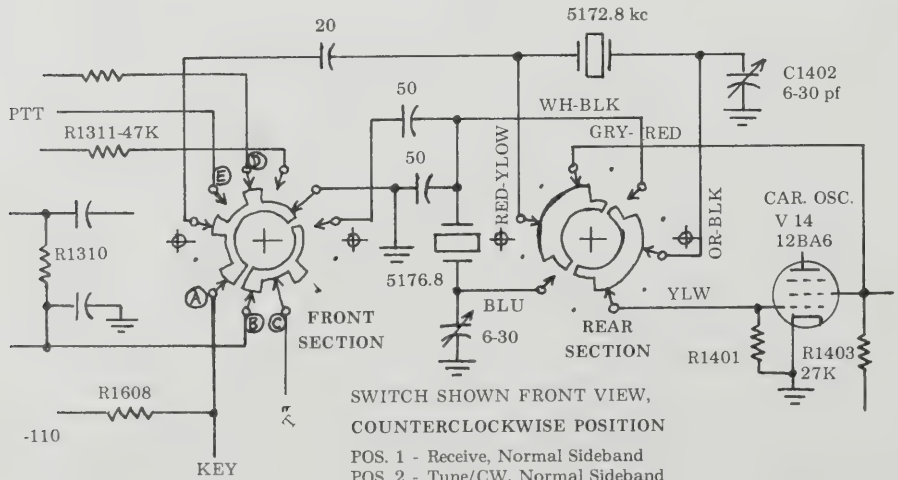


FIG. 14
SCHEMATIC

SWAN - 350, SIDEBAND SELECTOR KIT. Swan Electronics Corp., Oceanside, Calif.

SWAN 350 SIDEBAND SELECTOR KIT
Installation Instructions

Step 1 - Remove the bottom cover of Swan 350. Locate the REC. TUNE/CW switch. Refer to drawing of the "Original Switch", Fig. 1. Note the color code of wire going to lugs A-C-B-D-E. Write these colors on Fig. 1 for reference.

Step 2* - Remove the 47K resistor which goes from the switch to terminal strip, point I.

Step 3 - Remove the ground wire which goes from the switch to V11 ground lug.

Step 4 - Remove the 50 pf silver mica which goes from the switch to Pin 6 of V14. Save this capacitor.

Step 5 - Remove the sleeved wire which goes from point L to Pin 6 of V14. Save.

Step 6 - Remove the wire which goes from point M to Pin 1 of V14.

Step 7 - Locate the 27K resistor which goes from point J to point L. Disconnect from point L and connect instead from point J to pin 6 of V14.

Step 8 - Remove the original switch from the set.

Step 9 - Place the new switch part way in, and rotate so terminals D and E can be reached. Connect the wires which went to D and E of the two empty lugs of the new switch. Be sure to connect D to D, and E to E.

Step 10 - Turn the new switch so the front key locates properly, install the mounting nut securely. Put the knob on the shaft, and tighten the set screw.

Step 11 - Connect the wires that went to A-B-C of the original switch to A-B-C of the new switch. Note that B and C are interchanged in the Fig. 1 drawing.

Step 12 - Mount the new ceramic trimmer, using the 4-40 screws and nuts.

Step 13 - Connect wires from the new switch to points as listed:
Yellow wire to Pin 1 of V14;
Gray-Red wire to Pin 6 of V14;
Orange-Black wire to M;
Red-Yellow wire to L;
White-Black wire to N;
Blue wire to R;
47K resistor to K.

***SPECIAL NOTICE, concerning Step 2:**

(a) - On later series 350's, the 47K resistor mentioned in Step 2 is no longer used, and terminal K is vacant.

(b) - Refer to the "Original Switch" drawing, Fig. 1. A wire will be found going from Pin 8 of the 7360 tube to the switch lug located just to the right of lug D.

(c) - Find the corresponding switch lug on the new switch supplied with the kit. A 47K resistor will be found connected to this lug. Clip this resistor off and discard. Connect the wire from Pin 8 of the 7360 tube to this switch lug.

(d) - Disregard the last part of Step 13 which refers to the 47K resistor.

Step 14 - Connect a wire jumper from O. to R.

Step 15 - Connect a wire jumper from S. to Q.

Step 16 - Connect the 50 pf capacitor (saved from step 4) from S. to N.

Step 17 - Make certain all connections are soldered, and located correctly.

Step 18 - Plug the new 5176.8 KC crystal into its socket.

CARRIER FREQUENCY ADJUSTMENT, OPPOSITE SIDEBAND

NOTE - It will not be necessary to readjust the normally used carrier frequency. Installation of the sideband selector kit has a negligible effect on frequency setting of the 5172.8 KC crystal, so do not change the setting of the original ceramic trimmer.

A - An audio generator is required for exact setting of carrier frequency. Couple the A.F. generator into the Mic. Jack with a 3 circuit plug, the same type used with the microphone. Connect a switch to the PTT terminal of the plug so the transmitter may be turned on, (the same function performed by the push-to-talk switch on the microphone). First, tune the transmitter for normal output on the normally used sideband. Then switch to opposide sideband, and with the A.F. generator set to about 1200 cycles, adjust the Mic. Gain for a meter reading of 300 ma. Then change the A.F. generator to 300 cycles, and adjust the new ceramic trimmer for a meter reading of 150 ma. This corresponds to a roll-off of 6 db at 300 cycles. (The same procedure may also be used to check and adjust the normally used sideband carrier)

B - If an audio generator is not readily available, approximate adjustment may be made by the following method: Tune for normal output on the normally used sideband. Then switch to the opposite sideband, REC. position. Push the Mic. button, and adjust Car. Bal. for minimum meter reading. If the carrier frequency is too far up the filter slope, you will find that the Car. Bal. null adjustment is very sharp. Adjust the new ceramic trimmer so that the Car. Bal. adjustment is not so sharp. If the frequency is too far down the slope, you will find that Car. Bal. must be turned full CW or CCW to show much increase on the meter. In this case, adjust the trimmer for more carrier, but not so much that the Car. Bal. adjustment becomes too sharp. This approximate adjustment procedure will generally suffice for most operating.

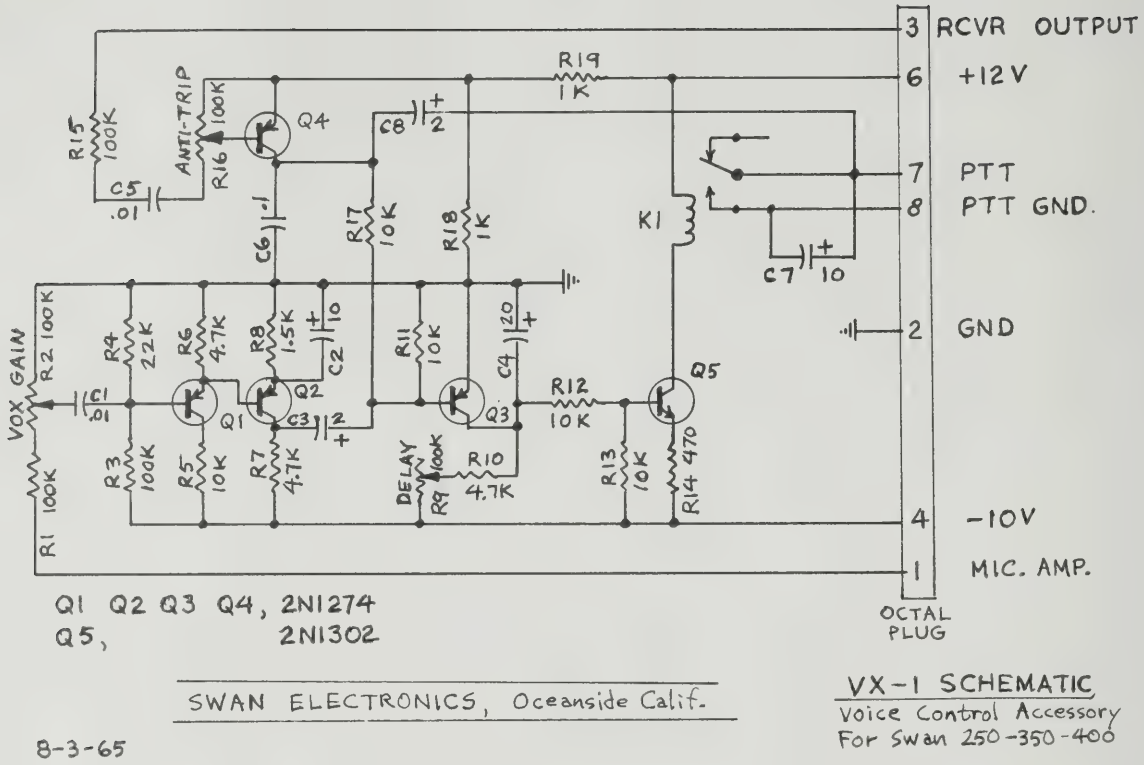


FIG. 15 PLUG IN VOX ACCESSORY, MODEL VX-1

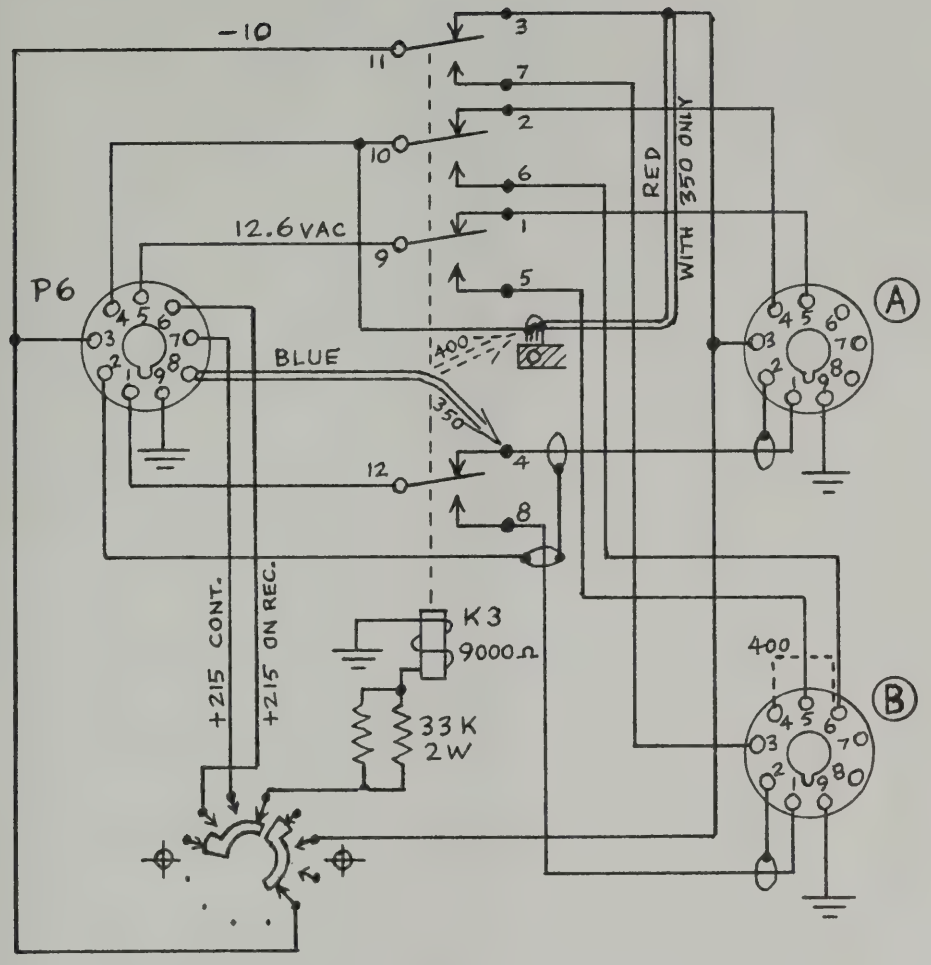
OPERATING INSTRUCTIONS

1. Place the VOX-PTT switch in the PTT position and adjust the transceiver for normal push-to-talk operation.
2. Plug in the VX-1 and rotate the VOX GAIN, ANTI-VOX, and DELAY controls fully counter-clockwise. Attach the top of the VX-1 to the 350 back with a G-32 screw.
3. Rotate the transceiver MIC. GAIN fully counter-clockwise. This will prevent audio from being transmitted but will not affect VX-1 during initial adjustments.
5. Place the VOX-PTT switch in the VOX position.
6. While speaking into the microphone in a normal manner, slowly rotate the VOX GAIN control clockwise until the VX-1 keys the transmitter. Do not use more VOX GAIN than necessary to assure positive operation at normal voice levels.
7. Increase the receiver gain until received signals are at a normal volume level. These signals will trip the Vox when picked up by the microphone.
8. With the microphone held in the normal operating position, very slowly increase the ANTI-VOX until received signals do not trip the Vox.

   NOTE: Excessive ANTI-VOX gain will cause received signals to gate the VX-1 off so that no amount of sound at the microphone will key the transmitter. Satisfactory balance between the VOX GAIN and ANTI-VOX is easily obtained when the microphone is at least a foot from the speaker.
9. Adjust the DELAY control to hold the transmitter keyed for the desired interval after you stop talking.

   NOTE: A little experimenting on the air will reveal that only a small portion of the first spoken syllable is lost when the VX-1 is actuated. Short DELAY settings will result in most efficient operation.

FIG. 16



External VFO for Swan-400 only

External VFO for Swan-350 and 400.

VFO Selector Switch
Pos. 1 - Transceive on VFO "A".
Pos. 2 - Transmit on VFO "A", Receive on VFO "B"
Pos. 3 - Transceive on VFO "B".

NOTE: When used with the Swan-350, VFO "A" is the internal and VFO "B" is the external VFO. Socket "A" on the adaptor is not used with the 350.

There are presently 3 models of Swan external VFO's. Any one of them may be used with the 350, and any combination of two of them may be used with the 400 transceiver.

Model-410, full coverage: $95
Model-406B, phone band, minature size: $75
Model-405, fixed channel: $45

SWAN MODEL—22 DUAL VFO ADAPTOR

Provides for addition of an external VFO to the Swan-350 single sideband transceiver or for use of two VFO's with the Swan-400.

SWAN ELECTRONICS CORP.
Oceanside, California

NOTE: Model-22 comes wired for use with the Swan-350. For use with the 400, see page 3.

NOTE: RF Gain Control remains on the 350 transceiver. If RF Gain Control is desired on the external VFO, see Special Note below.*

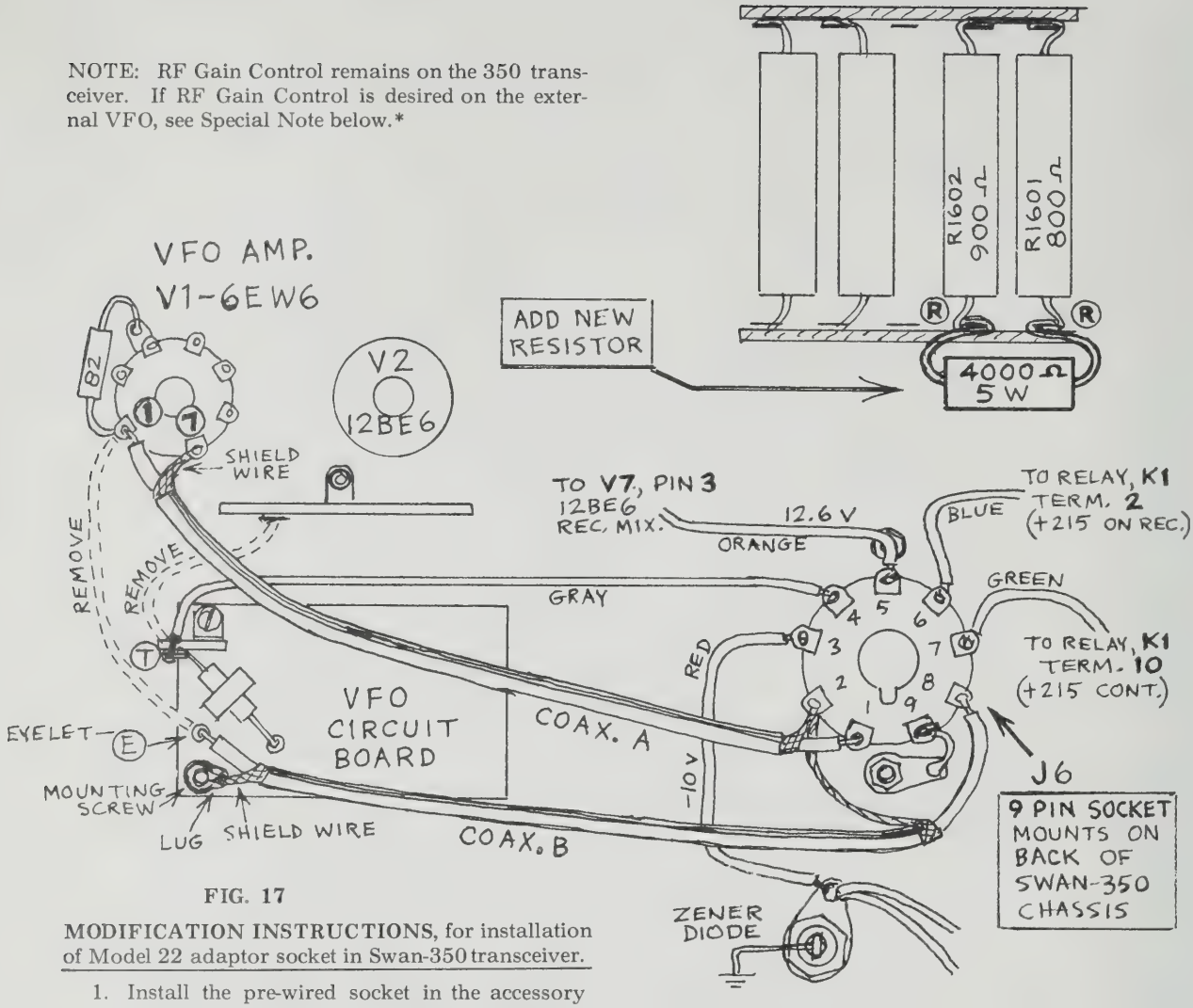


FIG. 17

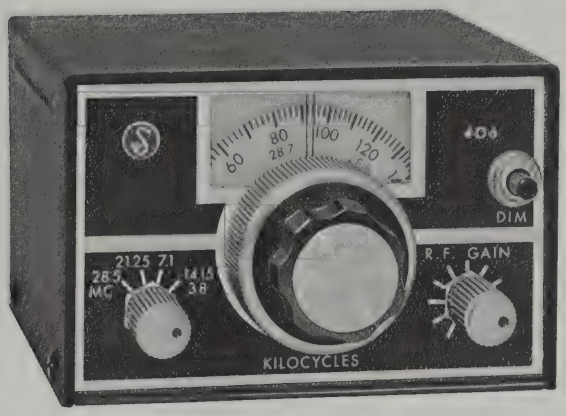
MODIFICATION INSTRUCTIONS, for installation of Model 22 adaptor socket in Swan-350 transceiver.

1. Install the pre-wired socket in the accessory location on the back of the 350. Be sure to orient the socket keyway so the Model-22 adaptor will plug in correctly. Secure the mounting screws tightly.
2. Disconnect the wire from pin 1 of tube socket V1, the 6EW6 VFO amp. Connect coax. A to pin 1 instead, and its shield to pin 7, which is grounded. Be sure to leave the 82 ohm resistor connected from pin 1 to ground.
3. Disconnect the other end of the wire from eyelet terminal "E" on the circuit board. Solder coax. B to this eyelet, and attach its shield wire to the grounded mounting screw with the lug provided.
4. Remove and discard the wire lead going to term. lug "T" on the circuit board, and connect the new gray wire to lug "T".
5. Connect the Red, Orange, Blue, and Green leads as illustrated.
6. Connect the new 4000 ohm 5-watt resistor to term. lugs R-R as illustrated.
7. The Model-22 adaptor may now be plugged into J6. Secure it to the back panel of the 350 with the screw which is provided. The external VFO plugs into socket B.

* Special Note:

(a) After the above modifications have been made, an external VFO may be plugged directly into J6 without using the Model 22. This feature is useful in cases where the 350 is to be truck mounted and a 406B is installed on the dash. Pin 5 of J6 may be wired to carry the RF Gain Control to the external VFO. Connect the orange wire from pin 5 of J6 to the bottom end of R602, 56 ohms, 1/2 watt.

(b) The internal VFO can be made operational without plugging the 22 adaptor in by using a jumper plug instead. Jumper pin 1 to pin 8 and pin 3 to pin 4.



SWAN MODEL 406B FREQUENCY CONTROL UNIT

Model 406B Frequency Control Unit is designed for full phone band coverage of 80, 40, 20 and 15 meters, and one 500 kc segment of the 10-meter band. The unit is specifically intended for mobile operation, and provisions for mobile mounting have been incorporated.

CIRCUIT THEORY

Q1, the 2N706 Oscillator operates in the common base configuration, as a Colpitts oscillator. See Figure 6. Capacitors C1801, C2001, and C2003 effectively tap the oscillator across only about 10 percent of the tank circuit. This results in exceptional stability. Q2, the Emitter Follower, is used for matching the impedance of the coaxial cable to the transceiver, as well as for isolation. The bandswitch selects the appropriate coil and trimmer for each range. Dial tracking is adjusted with the core and trimmer. With proper adjustment of coils and trimmers, the Model 406B may be used to cover any 200-kc segment in the 80- through 15-meter amateur bands, and any 500 kc segment of the 10 meter band.

INSTALLATION

A universal mounting bracket and mounting screws are supplied with the Model 406B. This bracket may be either top mounted, or bottom mounted, depending on where the 406B is to be mounted in the car. Many of the newer cars have a padded overhang. In other cases, attaching the mounting bracket to the bottom of the 406B will allow installation on a top surface. A row of small holes are provided along the sides of the 406B cabinet for top mounting of the bracket. You will find that the bracket will also allow tilting of the 406B. For bottom mounting, it will be necessary to drill additional holes along the bottom of the cabinet. Remove the cabinet first, and you will find chassis holes already provided for this purpose. Simply add these same holes to the cabinet.

ALIGNMENT

Alignment of the Model 406B requires only the use of a general coverage receiver tuning the frequency ranges between 8 mc and 24 mc. Calibration of the receiver is not critical since the crystal calibrator in the transceiver is used for final adjustment but the receiver must be accurate within 50 kc to permit selection of the proper 100 kc harmonic.

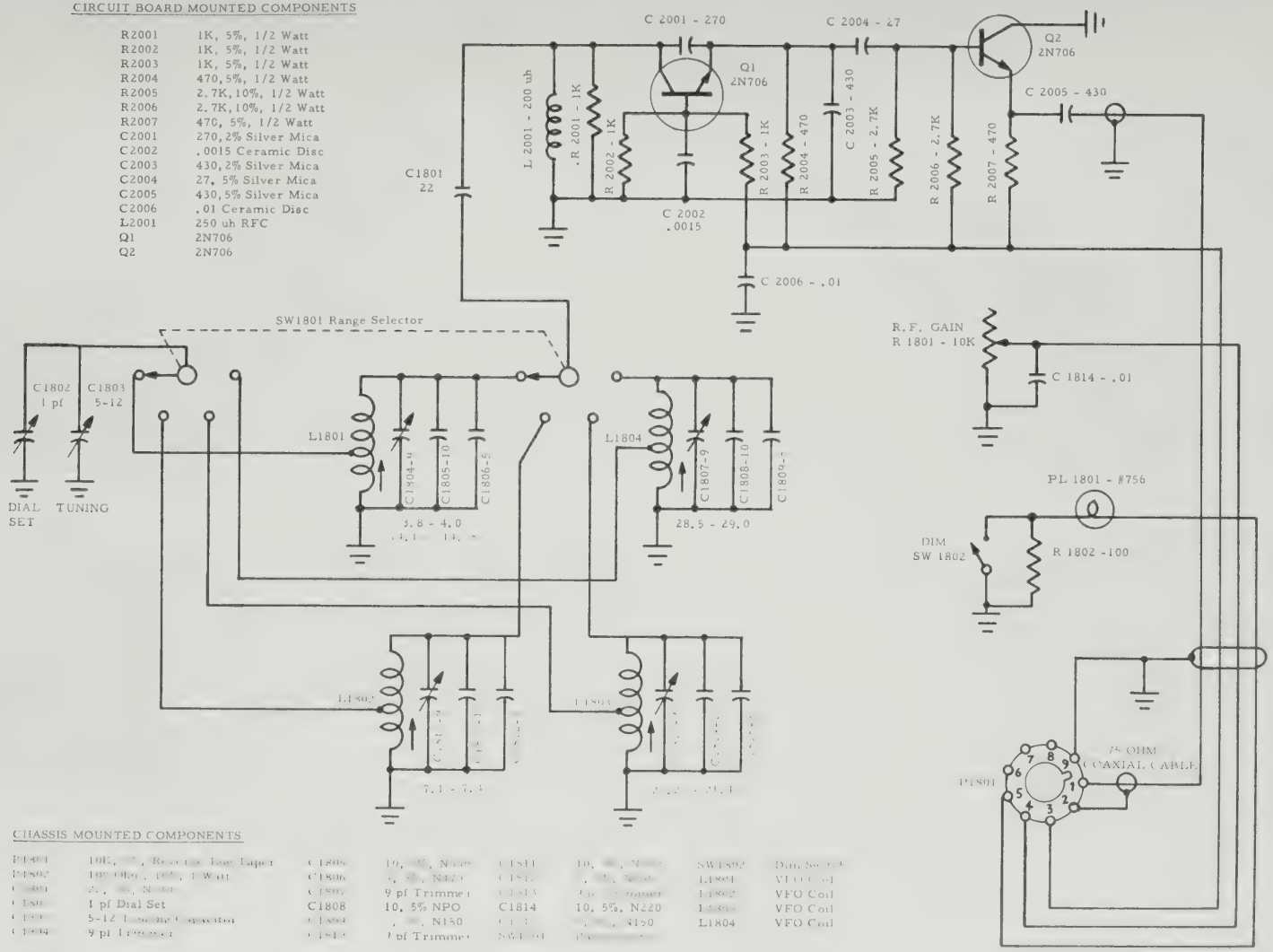
FOR MINOR FREQUENCY ADJUSTMENTS, which may be required after the initial aging period, simply remove the cabinet cover and very carefully adjust the trimmer capacitor marked for the specific range.

FOR MAJOR FREQUENCY ADJUSTMENTS
Tune Frequency Control Unit to low end of frequency range, and locate heterodyne with general coverage receiver at frequency indicated in the following table. Adjust vernier coil to bring heterodyne within a few kc of the receiver frequency, then switch on calibrator and adjust vernier coil for zero beat with calibrator at 100 kc increment of dial. Move tuning to high end of tuning range and adjust trimmer capacitor for zero beat. Repeat high and low end adjustments until calibration is correct at both ends. Coil and capacitor locations are marked in the unit.

406B FREQ RANGE	OSC. FREQ. (kc)	ADJUST COIL (Low end)	ADJUST CAP. (Hi end)
3.8-4.0 14.15-14.35	Low-High 8973-9173	L1801	C1804
7.1-7.3	12,273-12,473	L1802	C1810
21.25-21.45	16,077-16,277	L1803	C1813
28.5-29.0	23,327-23.827	L1804	C1807

CIRCUIT BOARD MOUNTED COMPONENTS

R2001	1K, 5%, 1/2 Watt
R2002	1K, 5%, 1/2 Watt
R2003	1K, 5%, 1/2 Watt
R2004	470, 5%, 1/2 Watt
R2005	2.7K, 10%, 1/2 Watt
R2006	2.7K, 10%, 1/2 Watt
R2007	470, 5%, 1/2 Watt
C2001	270, 2% Silver Mica
C2002	.0015 Ceramic Disc
C2003	430, 2% Silver Mica
C2004	27, 5% Silver Mica
C2005	430, 5% Silver Mica
C2006	.01 Ceramic Disc
L2001	250 uh RFC
Q1	2N706
Q2	2N706



CHASSIS MOUNTED COMPONENTS

P1801	10K, [illegible], Resistor Tone Taper	C1806	10, [illegible], N750	C1811	10, [illegible], N750	SW1802	Dim Switch
R1802	100 Ohm, [illegible], 1 Watt	C1806	[illegible], N150	C1812	[illegible], N150	L1801	VFO Coil
C1801	[illegible], [illegible], N750	C1807	9 pf Trimmer	C1813	[illegible] Trimmer	L1802	VFO Coil
C1802	1 pf Dial Set	C1808	10, 5% NPO	C1814	10, 5%, N220	L1803	VFO Coil
C1803	5-12 Tuning Capacitor	C1809	[illegible], N150	C1[illegible]	[illegible], N150	L1804	VFO Coil
C1804	9 pf Trimmer	C1810	7 pf Trimmer	SW1801	[illegible]		

FIG.18 SCHEMATIC DIAGRAM, MODEL 406B FREQUENCY CONTROL UNIT

SWAN MODEL 410 FREQUENCY CONTROL UNIT

Model 410 Frequency Control Unit is designed for full coverage of 80, 40, 20, 15 and 10 meters. The unit is specifically intended for fixed station operating and matches the 350 in height, depth, and styling.

CIRCUIT THEORY

Q1, the 2N706 Oscillator operates in the common base configuration, as a Colpitts oscillator. See Figure 6. Capacitors C1801, C2001, and C2003 effectively tap the oscillator across only about 10 percent of the tank circuit. This results in exceptional stability. Q2, the Emitter Follower, is used for matching the impedance of the coaxial cable to the transceiver, as well as for isolation. The bandswitch selects the appropriate coil and trimmer for each range. Dial tracking is adjusted with the coil and trimmer.

ALIGNMENT

Alignment of the Model 410 requires only the use of a general coverage receiver tuning the frequency ranges between 8 mc and 24 mc. Calibration of the receiver is not critical since the crystal calibrator in the transceiver is used for final adjustment but the receiver must be accurate within 50kc to permit selection of the proper 100 kc harmonic.

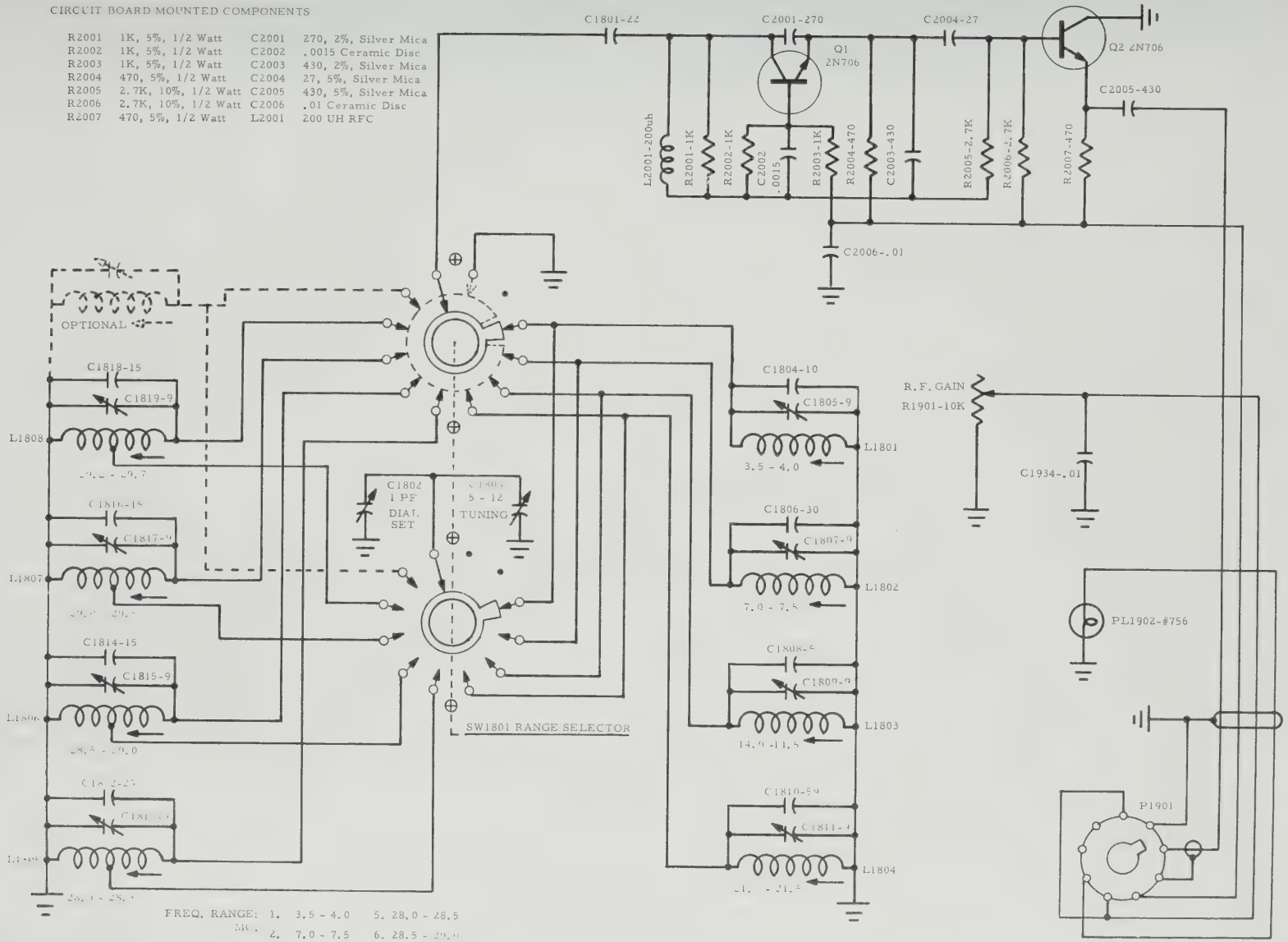
FOR MINOR FREQUENCY ADJUSTMENTS, which may be required after the initial aging period, simply remove the cabinet cover and very carefully adjust the trimmer capacitor marked for the specific range.

FOR MAJOR FREQUENCY ADJUSTMENTS Tune Frequency Control Unit to low end of frequency range, and locate heterodyne with general coverage receiver at frequency indicated in the following table. Adjust vernier coil to bring heterodyne within a few kc of the receiver frequency, then switch on calibrator and adjust vernier coil for zero beat with calibrator at 100 kc increment of dial. Move tuning to high end of tuning range and adjust trimmer capacitor for zero beat. Repeat high and low end adjustments until calibration is correct at both ends. Coil and capacitor locations are marked in the unit.

410 FREQ. RANGE	OSC. FREQ. (kc)	ADJUST COIL (Low end)	ADJUST CAP. (High end)
3.5— 4.0	8,673— 9,173	L1801	C1805
7.0— 7.5	12,173—12,673	L1802	C1807
14.0—14.5	8,827— 9,327	L1803	C1809
21.0—21.5	15,827—16,327	L1804	C1811
28.0—28.5	22,827—23,327	L1805	C1813
28.5—29.0	23,327—23,827	L1806	C1815
29.0—29.5	23,827—24,327	L1807	C1817
29.2—29.7	24,027—24,527	L1808	C1819

CIRCUIT BOARD MOUNTED COMPONENTS

R2001	1K, 5%, 1/2 Watt	C2001	270, 2%, Silver Mica
R2002	1K, 5%, 1/2 Watt	C2002	.0015 Ceramic Disc
R2003	1K, 5%, 1/2 Watt	C2003	430, 2%, Silver Mica
R2004	470, 5%, 1/2 Watt	C2004	27, 5%, Silver Mica
R2005	2.7K, 10%, 1/2 Watt	C2005	430, 5%, Silver Mica
R2006	2.7K, 10%, 1/2 Watt	C2006	.01 Ceramic Disc
R2007	470, 5%, 1/2 Watt	L2001	200 UH RFC



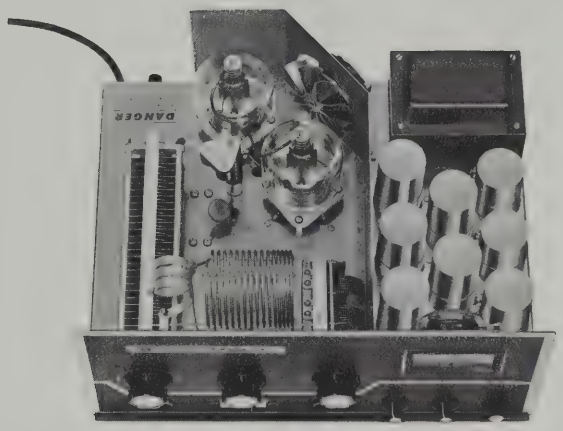
FREQ. RANGE: 1. 3.5 - 4.0 5. 28.0 - 28.5
MC. 2. 7.0 - 7.5 6. 28.5 - 29.0
3. 14.0 -14.5 7. 29.0 - 29.5
4. 21.0 -21.5 8. 29.2 - 29.7
(9. Additional Range, Optional)

FIG. 19 MODEL 410 VARIABLE FREQUENCY OSCILLATOR

SWAN MARK I

GROUNDED GRID LINEAR AMPLIFIER

2000 Watt PEP Input, 80 through 10 meters . . .

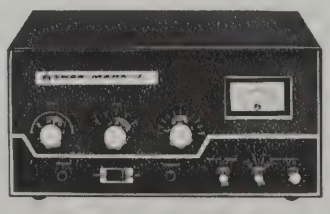


Swan again provides the ultimate in equipment design at a reasonable cost. The new MARK I Linear Amplifier uses two EIMAC 3-400Z or Amperex 8163 zero bias triodes in grounded grid circuit for conservative maximum legal input rating. Power switch reduces input to 1 KW dc input rating for CW and tune-up. Untuned input circuit provides maximum operating ease, fastest QSY capability. Built-in 2500 volt, solid state 117/220 volt AC supply is designed for extended trouble-free operation. New final tube cooling concept guarantees long tube life and reduces initial equipment cost. Dual changeover relays provide automatic barefoot or linear operation as desired. Wide range pi-output network allows use with variety of antenna systems without need for external matching networks. Designed by hams for hams, MARK I provides all necessary features for complete HF band operation. Metering of Grid current, Plate current, Plate voltage, and relative output, allows monitoring of all essential parameters and maximum ease in tune up.

Again Swan leads the field with maximum quality and dollar value

SPECIFICATIONS

- ★ Computer grade electrolytics provide 40 mfd. filter capacity for exceptional dynamic regulation.
- ★ Ceramic insulation on all tuning capacitors, RF switches and relays.
- ★ Built-in solid state 2500 volt power supply for 117 or 230 volts, 50-60 cycle AC.
- ★ Covers amateur bands 10 through 80 meters.
- ★ Two Eimac 3-400Z zero bias triodes in grounded grid circuit.
- ★ 2000 watts P.E.P. input, 1000 watts CW and tune input.
- ★ Drive requirements 100 watts.
- ★ Wide range pi output.
- ★ Includes changeover relay.
- ★ Approx. weight 55 lbs.
- ★ Dimensions: 19″ x 8½″ x 15½″.



CAUTION: NEVER REMOVE THE CABINET OR BOTTOM PLATE WHEN POWER LINE VOLTAGE IS CONNECTED. **HIGHLY LETHAL VOLTAGE** IS USED IN THIS AMPLIFIER. ALLOW AT LEAST ONE MINUTE FOR CAPACITORS TO DISCHARGE **AFTER** TURNING THE AMPLIFIER OFF AND PULLING THE PLUG.

INSTALLATION

(a) Remove the cabinet, and install a pair of Eimac 3-400Z tubes.

(b) Connect a short length of coaxial cable (RG-58 or RG8) from the transceiver or exciter to the input jack on the Mark I. This cable should be as short as practical, and preferably not more than 5 feet long. NOTE: Swamping the exciter or driver power with an attenuator is not normally required with drivers up to 400 watt PEP input rating. After proper tuning procedures have been followed, the Mic. Gain control will be used to set the level of drive. If the driver is called on for less than its maximum power, distortion products will be less, and overall performance improved.

(c) Connect a 2 conductor line from auxiliary switching contacts on the driver to the Relay Control jack on the Mark I. When using the Swan-240, 350, or 400 as a driver, the 2 conductors connect to "C" and "T" terminals on back of the transceiver.

(d) Connect the antenna coax. or dummy load to the output jack. If a low-pass filter is to be installed to reduce TVI, connect it between the output jack and the antenna.

(e) Connect a ground lead to the Mark I chassis. A water pipe or ground rod will be suitable.

(f) Power Line Connections — The Mark I is shipped from the factory for 230 volts operation. The white and black power cord wires go to 230 volts, with the green wire going to neutral-center, (ground). A plug is not supplied because of the many different types being used. To operate from a 117 volt source, remove the bottom cover and find the 4 screw terminal strip located near the power transformer. Remove the jumper wire which connects the two center screws, B and C. Connect a jumper wire from A to B and another jumper wire from C to D. Refer to the schematic for clarification. Then connect the white and black power cord wires to 117 volts, and the green wire to ground. Finally, remove the 20 amp. line fuses, and replace with 30 amp. fuses. NOTE: When the Mark I is used with 117 volts, current drain will exceed most outlet ratings, particularly in OPERATE position. It may be necessary to use only the TUNE-CW position, which will reduce power input, but will keep circuit breakers from kicking out. If it is necessary to operate with 117 volts try to run the Mark I on a separate circuit, and if possible, on the opposite side of the primary house circuit from the side used for the rest of the station. Always use 230 volts for the Mark I, when possible.

TUNING INSTRUCTIONS

1 — Always tune the exciter or transceiver first, with the Mark I turned OFF. Exciter output will be by-passed around the linear amplifier by the internal relay, and will go to whatever antenna or load is connected. The "Output" position of the Mark I meter circuit will indicate exciter output, and may be used conveniently as a tuning meter. Simply adjust the exciter controls for maximum output, using whatever tuning procedure is prescribed for the particular exciter. Then switch the exciter to standby or receive.

2 — Turn the Mark I to the ON position and allow several seconds for filament warm up. Leave the Meter switch in "Output" position. Set the Function Switch to TUNE-CW position. The green "Standby" light will be on, and the 3-400Z tube filaments will be lit brightly. The tubes are biased to cut-off in standby position, so IP and IG will read zero. EP will read approximately 1600 volts, depending on line voltage.

3 — Switch the exciter to TRANSMIT position, but with Mic. Gain turned down, and the carrier balanced out, so there is no R. F. output. (With the Swan 350 transceiver this is done by pressing the push-to-talk button). The Mark I will now be switched to TRANSMIT mode by the closing of the auxiliary contacts, and the red indicator light will come on. The 3-400Z tubes will now be drawing idling current, so IP will read approximately .1 amperes and EP approximately 1500 volts. IG should still read zero.

4 — Switch the Exciter to its "TUNE" position, and quickly adjust P.A. TUNE on the Mark I for maximum output. Then go back to the Exciter and adjust its P.A. TUNE for maximum output. (It may have changed slightly when switched into the Mark I). Next, adjust P.A. LOAD on the Mark I for maximum output, and then alternate between adjusting P.A. TUNE and P.A. LOAD until maximum output is reached. Set the Output Level Control as required to keep the meter from going off scale. The output reading is a relative indication, only. CAUTION: DO NOT KEEP THE EXCITER OR TRANSCEIVER IN TUNE POSITION FOR LONGER THAN **30 SECONDS** AT A TIME. This caution note concerns the exciter more than the Mark I, but since the power

amplifiers are operating at full input during tune, the time should always be kept short. If longer time is required, switch to standby for a minute, and then back to TUNE for 30 seconds. With experience in tuning procedures, it will be found that 30 seconds is more than enough time.

5—After tuning all controls for maximum output indication as described, other meter readings may be observed. IG (grid current) should indicate .2 to .5 amperes in TUNE position, depending on the amount of driving power. Swan transceivers will generally supply more driving power than others presently on the market. However, most transceivers will provide enough to drive the Mark I to full legal power. IP (plate current) should indicate between .6 and .8 amperes (see paragraph 9). The exact values of grid and plate current are not critical providing they do not exceed .6 grid amperes, and .8 plate amperes, and this only during short duration tuning periods.

6—To operate with SSB voice modulation, switch the Mark I to "OPERATE" position, and apply excitation with the driver, using the MIC. GAIN control directly as a power control. **IMPORTANT:** Once tuning procedures have been completed, set the meter switch to IP, and using average plate current as an indication of proper power level, set the Mic. Gain control for an average reading of .35 amperes. Only occasional voice peaks should kick to .5 amperes. Peak envelope power input will be at the legal limit of 2000 watts under these tuning conditions. **CAUTION:** Exercise care in setting the Mic. Gain control. Too high a setting will produce higher meter readings, but flat-topping and spurious emissions will result, as well as the possibility of exceeding legal power limits.

WARRANTY POLICY

SWAN ELECTRONICS CORPORATION WARRANTS THIS EQUIPMENT AGAINST DEFECTS IN MATERIAL OR WORKMANSHIP, EXCEPT FOR TUBES, TRANSISTORS, AND DIODES, UNDER NORMAL SERVICE FOR A PERIOD OF ONE YEAR FROM DATE OF ORIGINAL PURCHASE. THIS WARRANTY IS VALID ONLY IF THE ENCLOSED CARD IS PROPERLY FILLED IN AND MAILED TO THE FACTORY WITHIN TEN DAYS OF DATE OF PURCHASE. DO NOT SHIP TO THE FACTORY WITHOUT PRIOR AUTHORIZATION. THIS WARRANTY IS LIMITED TO REPAIRING OR REPLACING ONLY THE DEFECTIVE PARTS, AND IS NOT VALID IF THE EQUIPMENT HAS BEEN TAMPERED WITH, MISUSED OR DAMAGED.

7—When the Mark I Function Switch is in OPERATE position for SSB voice transmission, plate voltage is increased from the CW-TUNE value. In Standby or Receive condition, the 3-400Z tubes are biased to cut-off, so IP will be zero, and EP will indicate 2900 volts. In TRANSMIT position, without modulation, IP will show an idling current of .18 amperes, and EP will drop to 2650 volts. With voice modulation averaging .35 amperes, EP will drop to about 2500 volts. Occasional voice syllables may drop the plate voltage further, but with proper setting of the Mic. Gain control, dynamic regulation of the internal power supply is more than adequate. Use of computer grade electrolytics assures long capacitor life, and a net capacity of 40 mfd. across the plate supply. (Voltage readings are subject to line voltage variations).

8—To operate without the Mark I Linear Amplifier, simply switch it to "OFF". The antenna circuit is then by-passed around the amplifier by the internal relay and the transceiver-driver will operate "Barefoot".

9—To operate on CW-always keep the Function Switch in the TUNE-CW position in order to limit input power to 1000 watts. **CAUTION:** Because the Mark I uses a grounded grid amplifier circuit, input power measurements must include the driver stage input. Thus, if the driver is running 300 watts input, the linear amplifier input must be limited to 700 watts when in CW mode. Thus, you must first measure driver input, in order to determine how much input you may run to the Mark I. Use the EP meter position to measure plate voltage, and then calculate how much IP (plate current) you can run and stay within the legal limit. Then use the P.A. Load control to hold IP down to this level.

NOTE: It is quite possible to run well in excess of the legal power limit on CW as well as SSB with the Mark I. The design of an amplifier with linear characteristics up to the legal limit results in this capability. The burden of operating within legal limits falls on the operator and Swan Electronics Corporation is not responsible for improper or illegal operation. Every well informed operator should be familiar with measurement procedures, and with mathematical calculations of power level. Whenever possible, an oscilloscope should be used to monitor peak power levels, since ordinary meters are unable to do so.

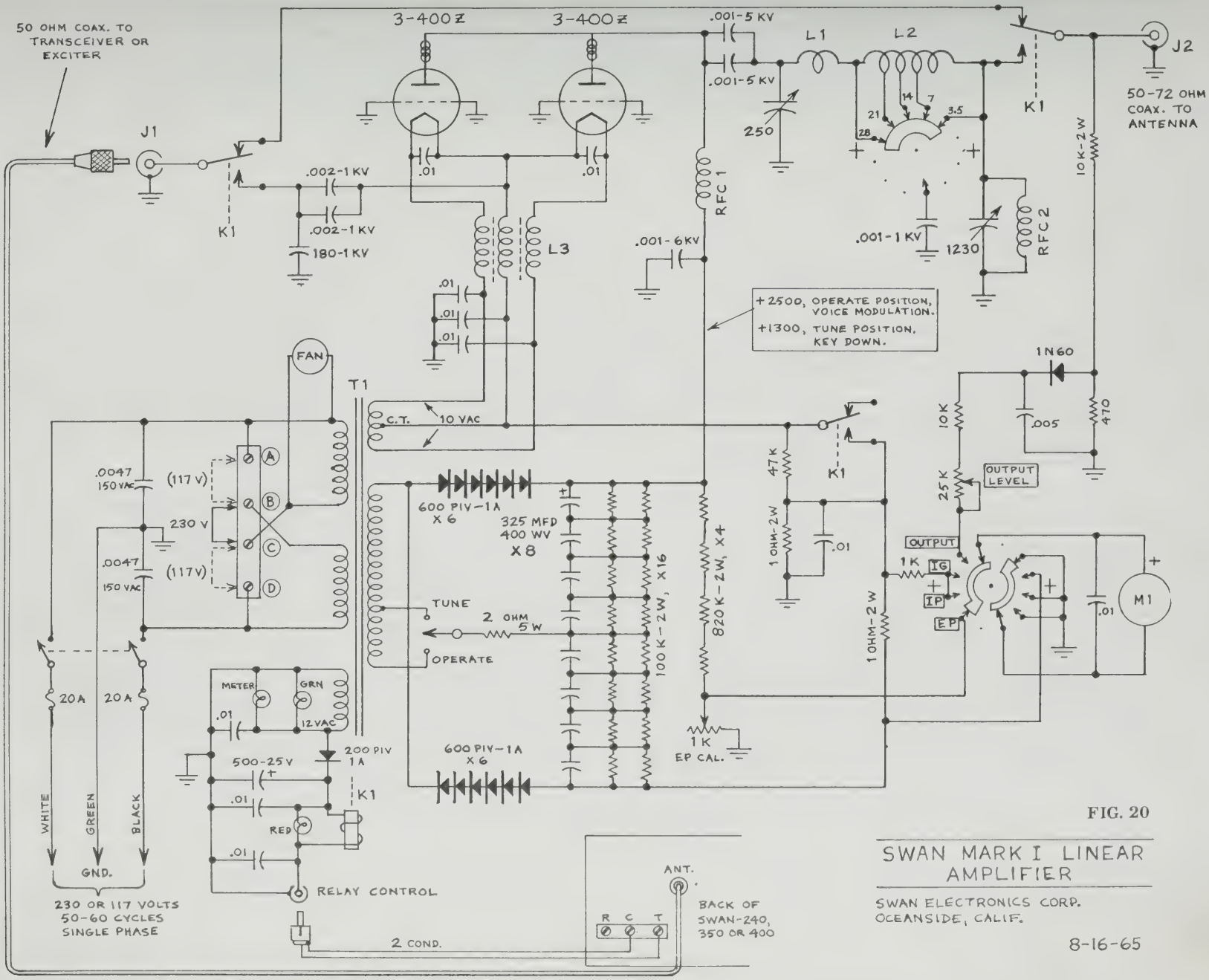


FIG. 20

SWAN MARK I LINEAR AMPLIFIER

SWAN ELECTRONICS CORP.
OCEANSIDE, CALIF.

8-16-65

SWAN MODEL RC-2 KIT

For use in trunk mount installations of
Model 350/400 SSB Transceiver

The RC-2 Kit includes the cables and plugs which will generally be required for trunk mounting the Swan-350 or 400. Since each installation is different, none of the cables are pre-wired or stripped. Study the schematic diagram carefully.

(A) The small cabinet which comes with the kit is for mounting the Mic. Jack and On-Off switch, and attaches to the bottom of the Model 406B mobile VFO. Simply remove the appropriate screws from the bottom, and use them to secure the cabinet to the bottom.

(B) 22 feet of 3-conductor (1 shielded) cable is provided for extending the microphone and push-to-talk circuit from the 350/400 to the new Mic. Jack.

(C) Another 22 foot length of cable with black vinyl jacket will be found, containing a 6-conductor cable and a coaxial R.F. cable. This group goes to the 9 pin plugs, as illustrated.

(D) The third cable has a total length of 30 feet, and runs from the 12 pin Jones plug at the 350/400 up to the engine compartment, or hood where the D.C. power supply is mounted close to the battery. A breakout at 22 feet carries the 2-conductor voice coil leads to the speaker, and the #8 filament line from the ON-OFF switch.

(E) The speaker leads may be wired to the car radio speaker located in the dash of the car. If this speaker must also be used with the regular car radio, a DPDT switch will be required. A more convenient suggestion is to connect the car radio to a rear seat speaker leaving the front speaker always connected to the transceiver.

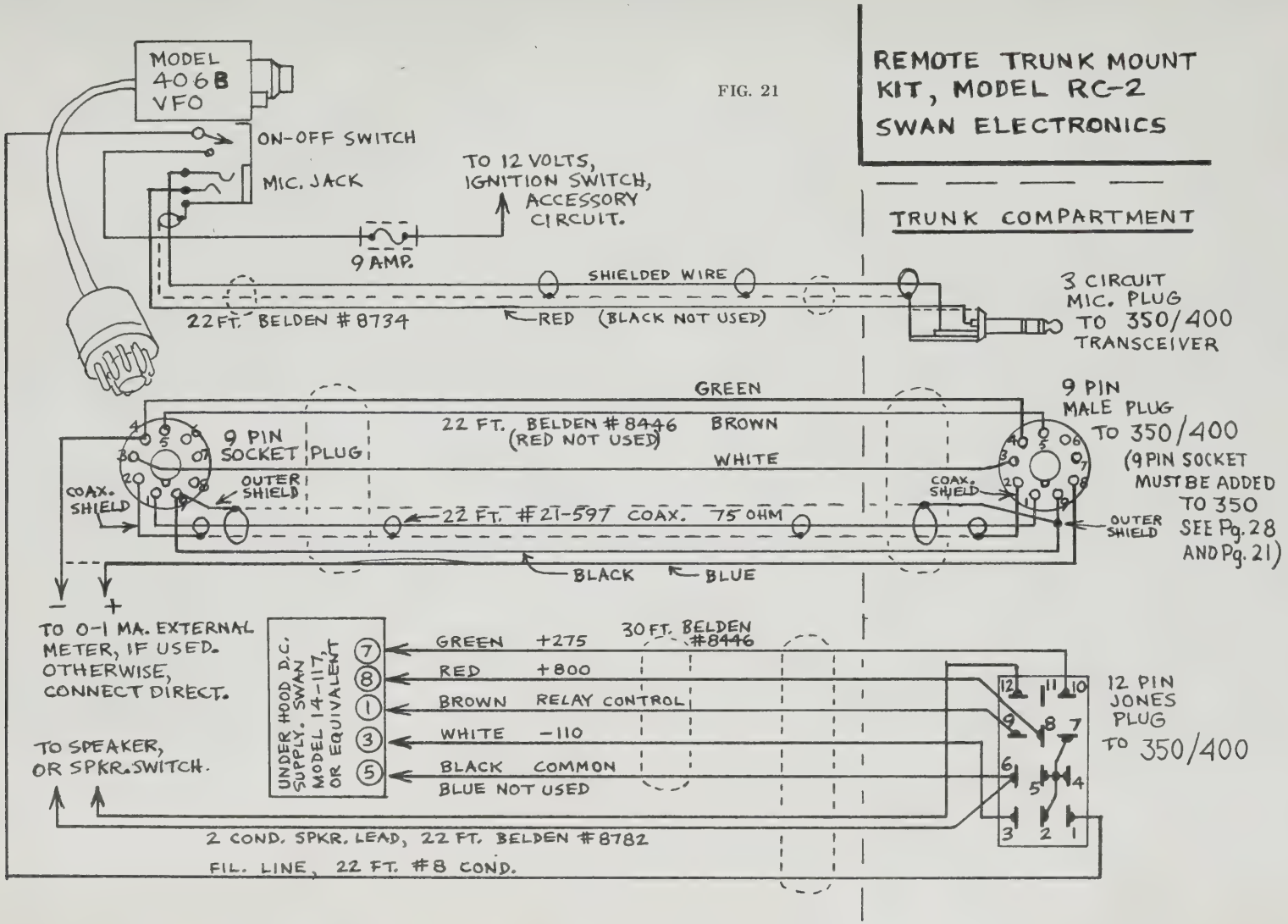
Note: To disable the speaker in the 400, remove the bottom cover and clip out the jumper going from Pin 11 to Pin 12 on the Jones connector. This does not actually have to be done, since the 400 has plenty of audio power.

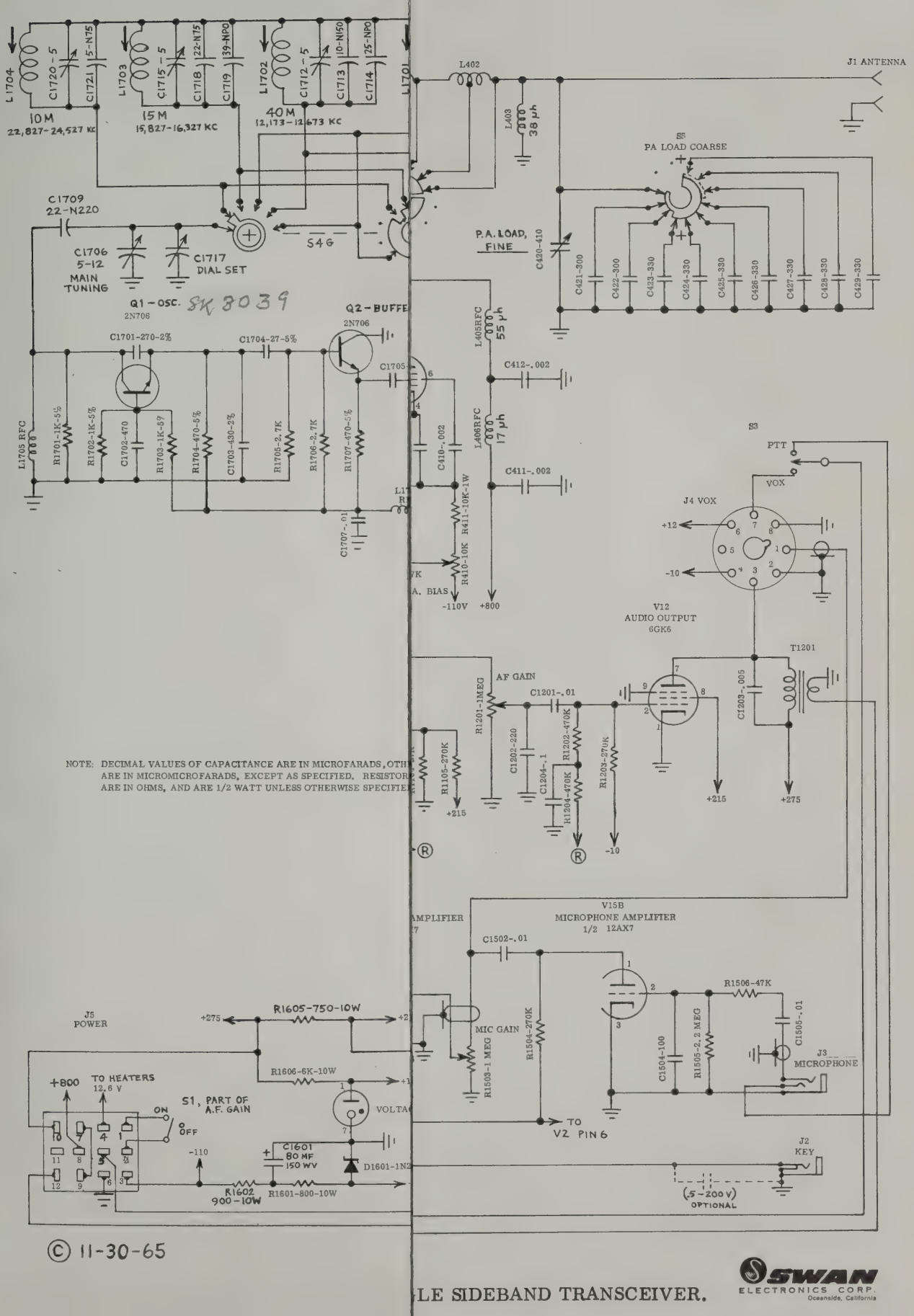
(F) The 12 volt Filament Supply line runs from the ON-OFF switch through an in-line 9 amp. fuse, to the accessory circuit of the ignition key. If the accessory terminal can be found conveniently, connect to it. Otherwise, locate the car radio fuse, and tap in on the hot side of it, since this will be on the accessory circuit. It is important to connect the filament line to the accessory circuit, because this will make certain that the D.C. supply is turned off when the ignition key is turned for starting the engine. The transient voltage spikes from the starter motor are a serious hazard to the power supply transistors.

(G) A small field strength meter mounted on the dash is strongly recommended for monitoring transmitter output. This will give the best indication that you are radiating normally. If an extension meter on the transceiver is desired, it may be tapped into the Pin 4 circuit of the VFO plug, as illustrated. A standard 0-1 ma. movement will be satisfactory, or you may write to the factory for purchasing a duplicate meter.

(H) The method for installing the 350 or 400 in the trunk is left up to the individual. If 75 meter operation is expected, and the antenna will be mounted on the back part of the car, it will be best to mount the transceiver so that the P.A. tune control can be reached with the trunk lid almost closed, with just enough gap to reach through for final adjustment. Otherwise, the trunk lid may detune the antenna considerably.

FIG. 21


REMOTE TRUNK MOUNT KIT, MODEL RC-2 SWAN ELECTRONICS
TRUNK COMPARTMENT
MODEL 406B VFO
ON-OFF SWITCH
MIC. JACK
TO 12 VOLTS, IGNITION SWITCH, ACCESSORY CIRCUIT.
9 AMP.
SHIELDED WIRE
22 FT. BELDEN #8734
RED (BLACK NOT USED)
3 CIRCUIT MIC. PLUG TO 350/400 TRANSCEIVER
GREEN
22 FT. BELDEN #8446 (RED NOT USED)
BROWN
WHITE
9 PIN SOCKET PLUG
9 PIN MALE PLUG TO 350/400 (9 PIN SOCKET MUST BE ADDED TO 350 SEE Pg. 28 AND Pg. 21)
COAX. SHIELD
OUTER SHIELD
22 FT. #21-597 COAX. 75 OHM
BLACK
BLUE
TO 0-1 MA. EXTERNAL METER, IF USED. OTHERWISE, CONNECT DIRECT.
TO SPEAKER, OR SPKR. SWITCH.
UNDER HOOD D.C. SUPPLY. SWAN MODEL 14-117, OR EQUIVALENT
30 FT. BELDEN #8446
GREEN +275
RED +800
BROWN RELAY CONTROL
WHITE -110
BLACK COMMON
BLUE NOT USED
12 PIN JONES PLUG TO 350/400
2 COND. SPKR. LEAD, 22 FT. BELDEN #8782
FIL. LINE, 22 FT. #8 COND.



© 11-30-65

LE SIDEBAND TRANSCEIVER.

SWAN ELECTRONICS CORP. Oceanside, California

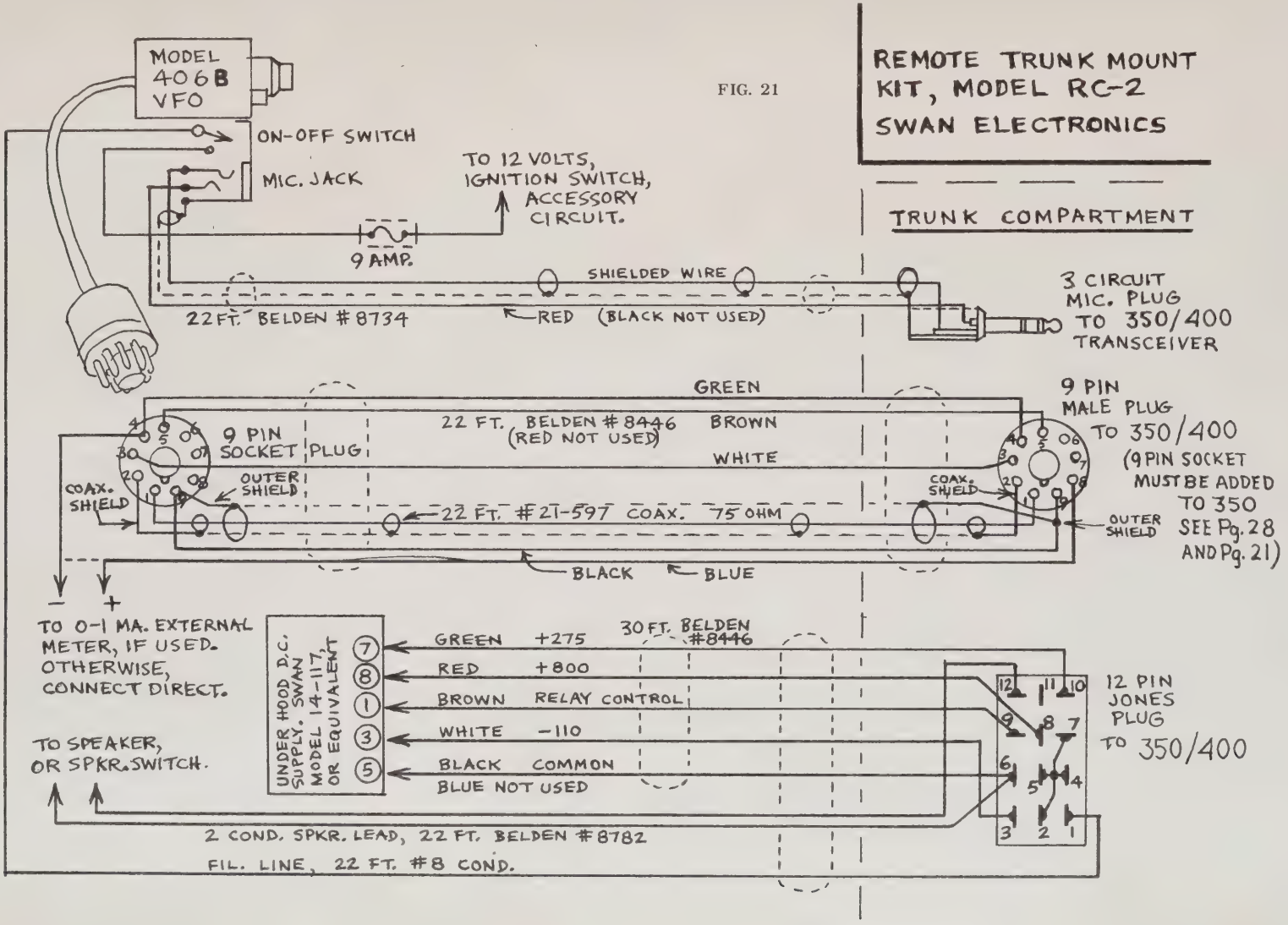
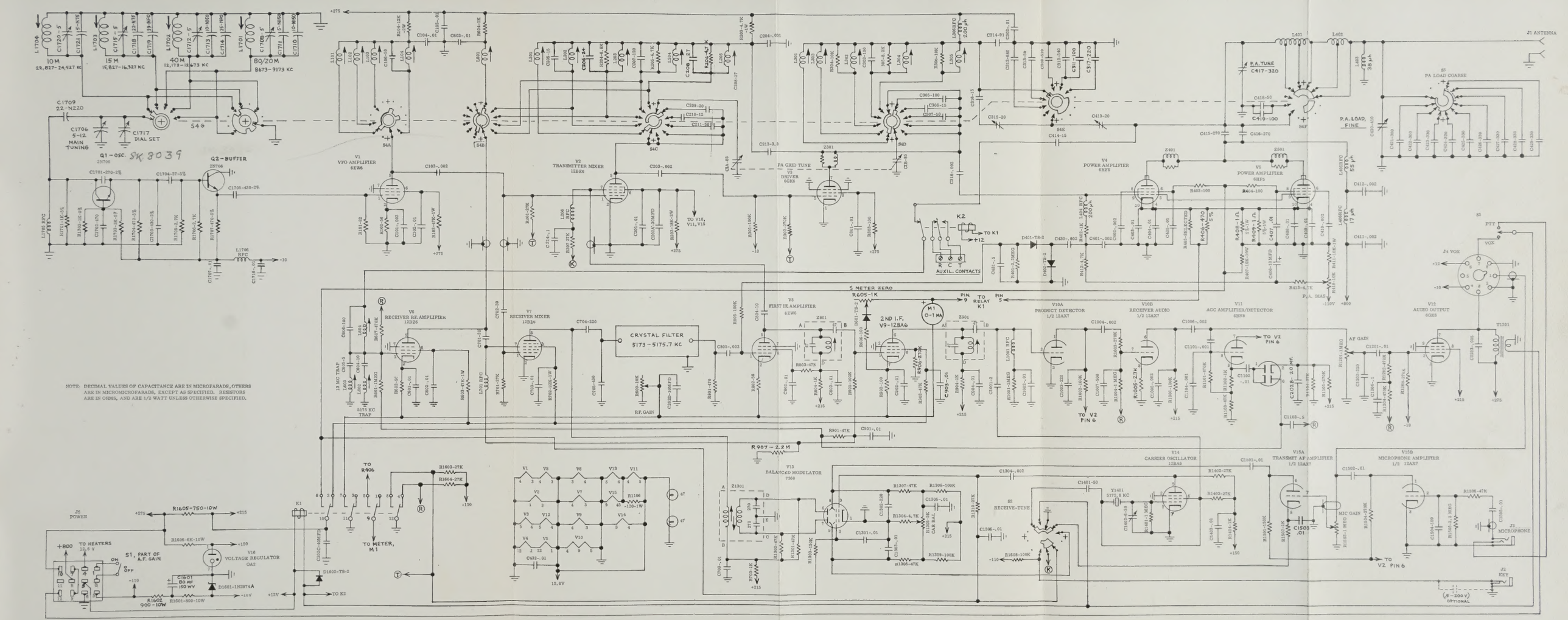


FIG. 21

REMOTE TRUNK MOUNT KIT, MODEL RC-2 SWAN ELECTRONICS

TRUNK COMPARTMENT



NOTE: DECIMAL VALUES OF CAPACITANCE ARE IN MICROFARADS, OTHERS ARE IN MICROMICROFARADS, EXCEPT AS SPECIFIED. RESISTORS ARE IN OHMS, AND ARE 1/2 WATT UNLESS OTHERWISE SPECIFIED.

© 11-30-65

SCHEMATIC DIAGRAM - SWAN MODEL 350 SINGLE SIDEBAND TRANSCEIVER.

SWAN ELECTRONICS CORP. Oceanside, California

WARRANTY POLICY

SWAN ELECTRONICS CORPORATION WARRANTS THIS EQUIPMENT AGAINST DEFECTS IN MATERIAL OR WORKMANSHIP, EXCEPT FOR TUBES, TRANSISTORS, AND DIODES, UNDER NORMAL SERVICE FOR A PERIOD OF ONE YEAR FROM DATE OF ORIGINAL PURCHASE. THIS WARRANTY IS VALID ONLY IF THE ENCLOSED CARD IS PROPERLY FILLED IN AND MAILED TO THE FACTORY WITHIN TEN DAYS OF DATE OF PURCHASE. DO NOT SHIP TO THE FACTORY WITHOUT PRIOR AUTHORIZATION. THIS WARRANTY IS LIMITED TO REPAIRING OR REPLACING ONLY THE DEFECTIVE PARTS, AND IS NOT VALID IF THE EQUIPMENT HAS BEEN TAMPERED WITH, MISUSED, OR DAMAGED.